Vol. 1109 Number 3

OFFICIAL GAZETTE

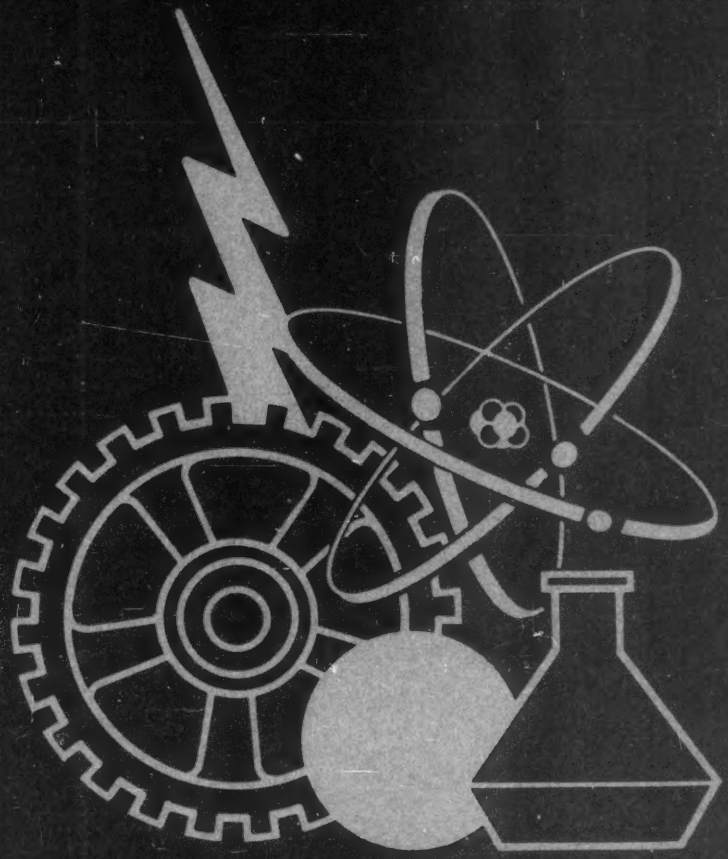
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

DECEMBER 19, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

December 19, 1989 Volume 1109 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 1, 1990, and was announced in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	
—If paid before Jan. 1, 1990	1040.00
—If paid on or after Jan. 1, 1990	1140.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Nov. 7, 1989.

JEFFREY M. SAMUELS
Acting Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on December 16, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,628,543 through 4,630,316
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on December 14, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,363,140 through 4,364,122
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an originasl or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 1, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,543,673	06/500,766	10/01/85
4,543,678	06/587,665	10/01/85
4,543,683	06/611,485	10/01/85
4,543,685	06/830,219	10/01/85
4,543,688	06/575,055	10/01/85
4,543,702	06/609,724	10/01/85
4,543,715	06/470,885	10/01/85
4,543,721	06/606,161	10/01/85
4,543,726	06/549,607	10/01/85
4,543,729	06/555,663	10/01/85
4,543,731	06/359,523	10/01/85
4,543,740	06/570,968	10/01/85
4,543,741	06/390,705	10/01/85
4,543,744	06/683,821	10/01/85
4,543,745	06/611,842	10/01/85
4,543,746	06/608,186	10/01/85
4,543,750	06/632,627	10/01/85
4,543,752	06/448,520	10/01/85
4,543,758	06/682,284	10/01/85
4,543,777	06/233,193	10/01/85
4,543,778	06/479,171	10/01/85
4,543,784	06/646,048	10/01/85
4,543,787	06/420,260	10/01/85
4,543,790	06/585,015	10/01/85
4,543,807	06/490,458	10/01/85
4,543,812	06/638,250	10/01/85
4,543,814	06/589,245	10/01/85
4,543,822	06/559,188	10/01/85
4,543,829	06/572,728	10/01/85
4,543,836	06/546,733	10/01/85
4,543,837	06/603,838	10/01/85
4,543,840	06/424,362	10/01/85
4,543,847	06/567,657	10/01/85
4,543,872	06/520,926	10/01/85
4,543,876	06/573,948	10/01/85
4,543,878	06/570,333	10/01/85
4,543,880	06/554,738	10/01/85
4,543,893	06/604,364	10/01/85
4,543,902	06/501,936	10/01/85
4,543,904	06/477,912	10/01/85
4,543,908	06/426,823	10/01/85
4,543,909	06/616,124	10/01/85
4,543,920	06/658,792	10/01/85
4,543,922	06/499,523	10/01/85
4,543,925	06/645,477	10/01/85
4,543,936	06/650,861	10/01/85
4,543,939	06/569,457	10/01/85
4,543,941	06/635,195	10/01/85
4,543,944	06/632,044	10/01/85
4,543,948	06/516,321	10/01/85
4,543,971	06/506,423	10/01/85
4,543,972	06/512,030	10/01/85
4,543,982	06/572,065	10/01/85
4,543,991	06/522,643	10/01/85
4,544,017	06/557,282	10/01/85
4,544,018	06/592,457	10/01/85
4,544,023	06/933,208	10/01/85
4,544,026	06/678,351	10/01/85
4,544,035	06/580,069	10/01/85
4,544,037	06/581,733	10/01/85
4,544,041	06/545,222	10/01/85
4,544,043	06/584,412	10/01/85
4,544,051	06/571,221	10/01/85
4,544,055	06/413,270	10/01/85
4,544,058	06/596,708	10/01/85
4,544,059	06/468,051	10/01/85
4,544,064	06/463,319	10/01/85
4,544,065	06/578,674	10/01/85
4,544,068	06/523,991	10/01/85
4,544,076	06/663,175	10/01/85
4,544,077	06/682,399	10/01/85
4,544,081	06/530,788	10/01/85
4,544,083	06/595,403	10/01/85
4,544,087	06/491,193	10/01/85
4,544,095	06/477,134	10/01/85
4,544,097	06/554,746	10/01/85
4,544,104	06/562,455	10/01/85
4,544,105	06/562,454	10/01/85
4,544,114	06/704,146	10/01/85
4,544,125	06/442,419	10/01/85
4,544,138	06/559,572	10/01/85
4,544,156	06/567,575	10/01/85
4,544,158	06/604,732	10/01/85
4,544,159	06/479,032	10/01/85
4,544,162	06/520,332	10/01/85
4,544,163	06/713,826	10/01/85
4,544,170	06/440,904	10/01/85
4,544,172	06/506,721	10/01/85

Patent Number	Serial Number	Issue Date
4,544,175	06/537,802	10/01/85
4,544,179	06/540,168	10/01/85
4,544,183	06/520,667	10/01/85
4,544,184	06/511,465	10/01/85
4,544,187	06/633,678	10/01/85
4,544,193	06/482,600	10/01/85
4,544,197	06/601,005	10/01/85
4,544,198	06/513,688	10/01/85
4,544,200	06/500,416	10/01/85
4,544,202	06/344,022	10/01/85
4,544,215	06/521,587	10/01/85
4,544,231	06/509,819	10/01/85
4,544,270	06/482,985	10/01/85
4,544,274	06/386,372	10/01/85
4,544,277	06/508,295	10/01/85
4,544,279	06/653,722	10/01/85
4,544,281	06/630,976	10/01/85
4,544,289	06/584,434	10/01/85
4,544,290	06/595,345	10/01/85
4,544,294	06/718,836	10/01/85
4,544,307	06/499,435	10/01/85
4,544,308	06/481,812	10/01/85
4,544,310	06/513,157	10/01/85
4,544,311	06/475,427	10/01/85
4,544,321	06/545,213	10/01/85
4,544,324	06/490,051	10/01/85
4,544,329	06/458,060	10/01/85
4,544,347	06/627,689	10/01/85
4,544,352	06/559,892	10/01/85
4,544,357	06/514,031	10/01/85
4,544,361	06/641,853	10/01/85
4,544,363	06/713,301	10/01/85
4,544,365	06/556,972	10/01/85
4,544,371	06/433,053	10/01/85
4,544,384	06/555,188	10/01/85
4,544,400	06/514,749	10/01/85
4,544,402	06/613,781	10/01/85
4,544,410	06/549,018	10/01/85
4,544,421	06/540,388	10/01/85
4,544,422	06/595,727	10/01/85
4,544,428	06/540,668	10/01/85
4,544,429	06/407,817	10/01/85
4,544,441	06/512,546	10/01/85
4,544,444	06/640,938	10/01/85
4,544,448	06/554,836	10/01/85
4,544,450	06/509,863	10/01/85
4,544,451	06/580,794	10/01/85
4,544,460	06/272,024	10/01/85
4,544,468	06/571,920	10/01/85
4,544,475	06/625,178	10/01/85
4,544,478	06/591,639	10/01/85
4,544,482	06/560,662	10/01/85
4,544,497	06/573,716	10/01/85
4,544,502	06/573,742	10/01/85
4,544,519	06/677,439	10/01/85
4,544,524	06/658,521	10/01/85
4,544,526	06/374,571	10/01/85
4,544,529	06/449,749	10/01/85
4,544,550	06/432,867	10/01/85
4,544,558	06/497,056	10/01/85
4,544,575	06/537,267	10/01/85
4,544,587	06/616,654	10/01/85
4,544,589	06/894,913	10/01/85
4,544,600	06/408,666	10/01/85
4,544,606	06/341,786	10/01/85
4,544,640	06/482,766	10/01/85
4,544,650	06/614,919	10/01/85
4,544,652	06/487,670	10/01/85
4,544,659	06/551,816	10/01/85
4,544,661	06/535,176	10/01/85
4,544,663	06/607,667	10/01/85
4,544,673	06/585,746	10/01/85
4,544,676	06/599,903	10/01/85
4,544,693	06/567,586	10/01/85
4,544,698	06/252,357	10/01/85
4,544,740	06/415,424	10/01/85
4,544,743	06/507,637	10/01/85
4,544,757	06/580,901	10/01/85
4,544,780	06/604,358	10/01/85
4,544,803	06/619,544	10/01/85
4,544,805	06/419,378	10/01/85
4,544,824	06/598,301	10/01/85
4,544,834	06/601,107	10/01/85
4,544,863	06/592,173	10/01/85
4,544,876	06/562,367	10/01/85
4,544,902	06/564,818	10/01/85
4,544,904	06/583,445	10/01/85
4,544,910	06/376,759	10/01/85
4,544,913	06/534,994	10/01/85
4,544,918	06/523,526	10/01/85
4,544,920	06/437,156	10/01/85
4,544,929	06/401,116	10/01/85
4,544,935	06/386,912	10/01/85
4,544,947	06/465,497	10/01/85
4,544,949	06/472,245	10/01/85
4,544,952	06/487,017	10/01/85
4,544,965	06/489,822	10/01/85
4,544,978	06/595,505	10/01/85
4,544,979	06/592,342	10/01/85
4,544,985	06/480,401	10/01/85
4,544,996	06/630,844	10/01/85
4,545,019	06/389,803	10/01/85
4,545,022	06/465,500	10/01/85
4,545,023	06/849,963	10/01/85
4,545,032	06/355,708	10/01/85
4,545,042	06/432,937	10/01/85
4,545,064	06/546,616	10/01/85

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,487,308	06/378,126	12/11/84	06/10/82	11/15/89
4,489,884	06/429,271	12/25/84	09/30/82	11/03/89

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,152,035, Re. S. N. 07/433,973, Filed Nov. 9, 1989, Cl. 312/211, TRASH COMPACTOR, Anthony Fox, Owner of Record:

Bradley Warren Fox, Attorney or Agent: Malcolm L. Moore, Ex. Gp.: 357

4,653,564, Re. S. N. 431,904, Filed Nov. 6, 1989, Cl. 160/168, TRACKS FOR BLINDS, Norbert Marocco, Owner of Record: *Inventor*, Attorney or Agent: George A. Rolston, Ex. Gp.: 355

4,666,968, Re. S. N. 07/428,700, Filed Oct. 30, 1989, Cl. 524/296, ESTER PLASTICIZERS FOR POLYARETHANE COMPOSITIONS, William J. Downey, Owner of Record: *Caschem, Inc., Bayonne, N. J.*, Attorney or Agent: Stanton T. Lawrence III, Ex. Gp.: 155

4,709,958, Re. S. N. 433,527, Filed Nov. 8, 1989, Cl. 296/177, RIDABLE VEHICLE AND ASSEMBLY METHOD, Lawrence R. Harrod, Owner of Record: *Krancso, San Francisco, Calif.*, Attorney or Agent: John McCormack, Ex. Gp.: 312

4,710,750, Re. S. N. 07/429,054, Filed Oct. 30, 1989, Cl. 340/522, FAULT DETECTING INTRUSION DETECTION DEVICE, Richard A. Johnson, Owner of Record: *C + K Systems, Inc., San Jose, Calif.*, Attorney or Agent: Ronald L. Yin, Ex. Gp.: 268

4,741,571, Re. S. N. 432,007, Filed Nov. 6, 1989, Cl. 296/107, MANUALLY FOLDABLE TOP FOR AUTOMOBILE VEHICLES, Robert G. Godette, Owner of Record: *Dura Corp., Adrian, Mich.*, Attorney or Agent: David A. Greenlee, Ex. Gp.: 312

4,769,328, Re. S. N. 07/375,335, Filed June 30, 1989, Cl. 435/68, EXPRESSION OF BIOLOGICALLY ACTIVE PDGE ANALOGS IN YEAST, Mark J. Murray, Owner of Record: *Zymo Genetics, Inc., Seattle, Wash.*, Attorney or Agent: David J. Maki, Ex. Gp.: 185

4,863,071, Re. S. N. 07/432,887, Filed Nov. 7, 1989, Cl. 222/207, PUMP AND CONTAINER ASSEMBLY, Theodore Guss, Owner of Record: *Continental Can Company, Inc.*, Attorney or Agent: Charles E. Brown, Ex. Gp.: 311

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,104,822, Reexam. No. 90/001,884, Requested Nov. 1, 1989, Cl. 46/48, ROTATING CIRCULAR AIRFOIL, Henry W. Rodgers, Owner of Record: *Inventor, Lakewood, Colo.*, Attorney or Agent: Unknown, Ex. Gp.: 330, Requester: Superflight, Inc., Palo Alto, Calif.

4,417,886, Reexam. No. 90/001,883, Requested Nov. 1, 1989, Cl. 604/53, CATHETER INTRODUCTION SET, Paul L. Frankhouser, et al., Owner of Record: *Arrow International, Inc., Reading, Pa.*, Attorney or Agent: Linderooth, Synnestvedt & Lechner, Ex. Gp.: 330, Requester: Hoffman & Barron, Jericho, N. Y.

4,537,160, Reexam. No. 90/001,885, Requested Nov. 6, 1989, Cl. 123/41.580, AIR CLEANER FOR AN AIR-COOLED ENGINE, Tetsuaki Shirai, Owner of Record: *Kawasaki Heavy Industries, Kobe, Japan*, Attorney or Agent: Marshall, O'Toole, Murray, et al., Ex. Gp.: 340, Requester: Owner

4,743,402, Reexam. No. 90/001,886, Requested Nov. 9, 1989, Cl. 260/412.2, NOVEL SUNFLOWER AND METHODS FOR THEIR PRODUCTS, Gerhardt N. Fick, Owner of Record: *Sigco Research, Inc., Breckenridge, Minn.*, Attorney or Agent: Stephen A. Bent, Ex. Gp.: 120, Requester: Hollie L. Baker, Washington, D. C.

Erratum

"All reference to Patent No. 4,862,880 to Karl M. Richter for LOCKING NAIL appearing in the Official Gazette of September 5, 1989 should be deleted since no patent was granted."

"All reference to Patent No. 4,863,913 to Robert C. Hider, et al. for PHARMACEUTICAL COMPOSITIONS appearing in the Official Gazette of September 5, 1989 should be deleted since no patent was granted."

"All reference to Patent No. 4,871,932 to Helmut Moosmann et al. of Federal Republic of Germany for CIRCUIT ARRANGEMENT FOR MONITORING SPEED OF A DRIVE MOTOR appearing in the Official Gazzette of October 3, 1989 should be deleted since no patent was granted."

Notice of Final Rulemaking
Patent and Trademark Automated Search System Fees

The Patent and Trademark Office is amending the rules of practice in patent and trademark cases to establish fees for access to the automated patent and trademark search systems. Public Law 100-703, enacted on November 19, 1988, allows the Commissioner to establish reasonable fees for on-line access to these systems. The effective date of the new fees is February 12, 1990.

The new fees are for the on-line use of APS-Text which is the USPAT data base (full-text of U.S. patents issued after 1974), U.S. classification data from 1790 to the present, and English abstracts of Japanese and Chinese patents (to the extent they are available), and T-Search which is the automated trademark search system. These systems are located in the Patent Search Room and Trademark Search Library, respectively, located in Crystal City, Virginia.

Except for a series of pilot experiments which may occur over the next one or two years, the Office does not plan to provide routine remote on-line access to these data bases at any other facilities at the present time. A separate rulemaking process will be followed when the Office determines to provide such remote on-line access.

The paper and/or microfilm collections of U.S. patents, foreign patent documents and U.S. trademark registrations continue to be available to the public free of charge. The Office reaffirms its commitment to hold a public hearing prior to making any decision concerning the elimination of the paper files.

The Office is setting fees at $40.00 for each hour of APS-Text or T-Search terminal session time, including print time. The fee for each printed page generated from the systems is set at $.10 per page. In the case of the APS-Text, a fee of $25.00 is set for each hour of Office staff assistance to conduct a search. Information on training, reservation of terminal time, payment of fees, and waiver of fee payments under certain circumstances is included in the final rule package.

In response to the notice of proposed rulemaking published in the Federal Register on May 3, 1989 (54 FR 18907), and at a public hearing held on June 30, 1989, the Office received many comments regarding problems encountered by the public in the use of T-Search. The Office believes that T-Search has proven effective for searches performed by Trademark examining attorneys in connection with their examination of applications for the registration of marks. Although the Office is establishing a fee for accessing the T-Search system, the Commissioner is immediately suspending collection of that fee to provide additional time for the public to familiarize themselves with T-Search. The Office will provide the public with sixty days notice before starting to collect the fee.

A copy of the final rule was published in the Federal Register on December 11, 1989 (54 FR 50942).

Bradford R. Huther
Assistant Commissioner
for Finance and Planning

December 11, 1989
Date

PATENT NOTICES

Certificates of Correction For Week of December 19, 1989

D. 300,920	4,775,465	4,797,126	4,814,383
PP. 6,616	4,775,917	4,797,134	4,814,413
Re. 32,830	4,776,082	4,799,156	4,814,691
4,476,926	4,776,581	4,799,483	4,816,025
4,566,526	4,776,730	4,800,079	4,816,124
4,580,277	4,778,063	4,801,153	4,816,169
4,652,657	4,778,975	4,801,489	4,817,166
4,654,029	4,779,165	4,802,095	4,817,210
4,663,870	4,780,654	4,802,655	4,818,542
4,685,123	4,781,904	4,802,769	4,818,603
4,693,875	4,782,610	4,802,961	4,820,350
4,701,173	4,783,151	4,803,656	4,822,395
4,707,155	4,783,341	4,803,831	4,822,762
4,707,719	4,783,411	4,804,558	4,822,902
4,716,592	4,783,987	4,804,951	4,823,304
4,719,743	4,784,080	4,805,702	4,823,350
4,730,111	4,784,174	4,805,949	4,823,367
4,733,404	4,784,519	4,806,262	4,823,473
4,748,765	4,785,449	4,806,482	4,823,545
4,751,511	4,785,500	4,806,586	4,823,646
4,755,368	4,786,737	4,806,834	4,824,718
4,760,286	4,787,749	4,807,182	4,825,285
4,760,314	4,788,119	4,807,515	4,825,371
4,763,695	4,789,547	4,808,295	4,825,607
4,764,251	4,791,184	4,808,442	4,826,335
4,765,077	4,792,067	4,809,170	4,827,051
4,769,079	4,792,611	4,811,575	4,829,583
4,769,181	4,792,731	4,811,977	4,830,600
4,770,666	4,792,768	4,812,056	4,831,238
4,771,507	4,793,278	4,812,167	4,841,519
4,772,199	4,793,400	4,812,587	4,841,571
4,772,475	4,794,294	4,812,904	4,846,295
4,773,034	4,794,314	4,813,343	4,856,197
4,773,231	4,794,515	4,813,690	4,859,428
4,774,229	4,794,632	4,814,140	
4,774,348	4,795,246	4,814,159	
4,774,676	4,795,424	4,814,200	

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PATENT APPLICATION	New patent application and associated papers and fees.
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Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
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Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State University	(503) 378-4239
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	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF November 4, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	10-19-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	6-7-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 STEWART LEVY, Acting Director	9-21-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	10-21-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	1-15-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during November 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,702,012 to 3,704,468 inclusive
Plant Patents	None

REEXAMINATIONS

DECEMBER 19, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,842,235 (1171st)

METHOD OF ELECTRIC SEAM RESISTANCE WELDING

Paul Opprecht, Bergdietikon, Switzerland, assignor to Elpatronic AG, Zug, Switzerland

Reexamination Request No. 90/001,056, Jul. 15, 1986.

Reexamination Certificate for Patent No. 3,842,235, issued Oct. 15, 1974, Ser. No. 315,007, Dec. 14, 1972.

Int. Cl.[4] B23K *11/06*

U.S. Cl. 219—83

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–6, 8,** and **11–23** is confirmed.

Claims **7, 9, 10,** and **24–26** are cancelled.

1. In a method of electric seam resistance welding by means of a single-wire electrode in contact with two electrode support rolls, the improvement wherein the wire electrode is prehardened by drawing or rolling the wire, before said wire runs onto the first electrode support roll, to an extent such that substantially no further permanent deformation occurs under the subsequent welding pressure of the electrode support rolls and at the welding temperature applied, and wherein said wire has a cross section in the shape of a sector having straight or convex flanks.

B1 3,858,147 (1172nd)

NON-INDUCTIVE FILM-TYPE CYLINDRICAL RESISTOR

Richard E. Caddock, 640 Sandalwood Ct., Riverside, Calif. 92507

Reexamination Request No. 90/001,448, Feb. 26, 1988.

Reexamination Certificate for Patent No. 3,858,147, issued Dec. 31, 1974, Ser. No. 424,787, Dec. 14, 1973.

Continuation-in-part of Ser. No. 315,018, Dec. 14, 1972,

Int. Cl.[4] H01C *3/02*

U.S. Cl. 338—62

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **11–14** and **16** is confirmed.

Claims **1–3, 8–10** and **15** are cancelled.

Claim **4** is determined to be patentable as amended.

Claims **5–7,** dependent on an amended claim, are determined to be patentable.

New claims **17–20** are added and determined to be patentable.

4. [The invention as claimed in claim **3,** in which] *A film-type electrical resistor, which comprises:*

a. an elongated cylindrical heat-resistant substrate,

b. an electrically resistive film adherently provided by the silk-screen process on the exterior cylindrical surface of said substrate, said resistive film comprising an elongated narrow strip of resistive material,

said strip being shaped in a serpentine manner, whereby current flows in opposite directions through adjacent portions of said strip, thereby minimizing the inductance of the resistor,

said serpentine strip [comprises] *comprising* a multiplicity of hairpin shaped portions the arms of which are substantially parallel to each other, said arms being connected to each other by base portions, [and in which] each of said arms [is] *being* spaced less than 100 thousandths of an inch from each adjacent arm to thereby achieve effective cancellation of the inductance of the resistor,

said strip having a cross-sectional shape, in a direction perpendicular to the length of said strip, that the exterior surfaces of the edges of said strip converge toward said cylindrical surface in a feathered manner, said film being present on substantial portions of said surface, but being absent at a gap which extends along the full length of one side of said surface parallel to the axis of said substrate, and

c. termination means electrically connected to opposite end portions of said resistive film, and permitting connection of said film in an electrical circuit.

B1 4,140,707 (1173rd)

MALONATO PLATINUM ANTI-TUMOR COMPOUNDS

Michael J. Cleare; James D. Heescheler; Barnett Rosenberg, and Loretta L. Van Camp, all of East Lansing, Mich., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.

Reexamination Request No. 90/001,716, Feb. 14, 1989.

Reexamination Certificate for Patent No. 4,140,707, issued Feb. 20, 1979, Ser. No. 778,955, Mar. 18, 1977.

Continuation of Ser. No. 260,989, Jun. 3, 1972, abandoned.

Int. Cl.[4] C07F *15/00*

U.S. Cl. 556—137

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **3** and **4** are cancelled.

Claim **1** is determined to be patentable as amended.

Claim **2,** dependent on an amended claim, is determined to be patentable.

New claims **5, 6,** and **7** are added and determined to be patentable.

1. Platinum coordination compounds having the formula:

$$[Pt(II)A_x((OOC)_2{-}CRR_1)]$$

wherein:

x=1 or 2;

R and R_1 are selected from the group consisting of H, lower alkyl, aryl, aralkyl, alkenyl, cycloalkyl, cycloalkenyl, alkoxy, OH, or combine with the carbon atom *in* CRR_1 to form a cycloalkyl or cycloalkenyl group;

when x=1, A is $HR_2N{-}CHR_3{-}CHR_4{-}NR_5H$ and when x=2, A is H_2NR_6 or an amino acid, wherein R_2, R_3, R_4 and R_5 are the same or different and are selected from the group consisting of H, CH_3, C_2H_5, hydroxy and lower alkoxy, provided that R_2 and R_5 [may also be] *are also selected from the group consisting of* aryl or aralkyl and each R_6 is the same or different and is selected from the group consisting of H, lower alkyl, aryl, aralkyl, hydroxy lower alkyl, hydroxyl- and alkoxylamines, and alkoxyl alkyl amines, *provided that when x=2 and A is* H_2NR_6 *and* R_6 *is H, then R and* R_1 *are not both H.*

B1 4,149,197 (1174th)

DIRECT IMAGING APPARATUS FOR AN ELECTRONIC DOCUMENT TRANSMITTER UTILIZING A LINEAR ARRAY OF PHOTO-DETECTORS

Steven Kos, and David R. Baraff, both of Ottawa, Canada, assignors to Bell-Northern Research Ltd., Ottawa, Canada

Reexamination Request No. 90/001,513, May 18, 1988.
Reexamination Certificate for Patent No. 4,149,197, issued Apr. 10, 1979, Ser. No. 840,648, Oct. 11, 1977.
Int. Cl.[4] H04N *1/04*
U.S. Cl. 358—471

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–7** are cancelled.

[1. A direct imaging apparatus for an electronic reader of documents, comprising:

a transparent substrate;

a plurality of photo-detectors on a top surface of said substrate, said photo-detectors spaced apart in a linear array;

spacer means on said top surface of said substrate to position a document a predetermined distance from said photo-detectors;

illuminating means below said substrate for illuminating said document through apertures in said linear array;

opaque means between said photo-detectors and said illuminating means to prevent direct impingement of light from said illuminating means on to said photo-detectors;

contact means connected to each photo-detector for abstraction of signals indicative of light reflected from said document impinging on said photo-detectors.]

B1 4,522,022 (1175th)

ROLLERS FOR FRICTION SPINNING APPARATUS

Alan Parker, Bolton, and William M. Farnhill, Burnley, both of England, assignors to Hollingsworth (U.K.) Limited

Reexamination Request No. 90/001,760, Apr. 24, 1989.
Reexamination Certificate for Patent No. 4,522,022, issued Jun. 11, 1985, Ser. No. 549,023, Nov. 7, 1983.
Claims priority, application United Kingdom, Nov. 9, 1982, 8331908
Int. Cl.[4] D01H *1/135, 7/882*
U.S. Cl. 57—401

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **8**, **9** and **10** is confirmed.

Claim **1** is determined to be patentable as amended.

Claims **2**, **3**, **4**, **5**, **6** and **7**, dependent on an amended claim, are determined to be patentable.

1. In a friction spinning apparatus comprising first and second rotatable members arranged in closely spaced relationship so as to define therebetween adjacent the line of closest approach a throat, and a fibre feed means for feeding fibres into the throat for twisting into yarn, the fibre feed means opening at one side of said line of closest approach at which said first rotatable member has its surface moving into said throat and the second rotatable member [has] *having* its surface moving out of the throat;

the improvement wherein:

the surface of each of the rotatable members has a roughness characteristic of from 40 to 250 micro inches[.]*; and the roughness characteristic of one of said rotatable members is different from that of the other of said rotatable members by from 20 to 100 micro inches.*

B1 4,557,656 (1176th)

TOP FEEDING AND EJECTING MATERIALS HANDLING APPARATUS

Joseph F. Ouellette, Glendale, Mo., assignor to Ouellette Machinery Systems Inc., Fenton, Mo.

Reexamination Request No. 90/001,552, Jul. 14, 1988.
Reexamination Certificate for Patent No. 4,557,656, issued Dec. 10, 1985, Ser. No. 950,280, Oct. 11, 1978.
Int. Cl.[4] B65G *60/00, 57/03, 59/02*
U.S. Cl. 414—790.8

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **2–8** is confirmed.

Claim **1** is cancelled.

New claims **9–12** are added and determined to be patentable.

9. A materials handling device having a frame, means forming a bay in the frame for loading a pallet,

conveying means for conducting a loaded pallet from the bay,

an elevator for supporting a pallet in the bay for vertical movement between an elevated position where the elevator can receive a first pallet to be loaded and a lower position where the elevator can discharge a loaded first pallet,

means for sequencing the elevator downwardly in steps as successive layers of product are deposited on the first pallet,

transverse carriage means including transfer plate means supported for transverse movement of the transverse carriage means and transfer plate means between a ready position laterally adjacent the path of vertical movement of the elevator and a loading position aligned with the path of vertical movement of the elevator,

whereby when the transfer plate means is in the ready position a second pallet can be supported on the transfer plate means during loading of the first pallet while the first pallet is on the elevator, and when the transfer plate means is moved to the loading position it can support the second pallet to be at least partially loaded,

means to sequence the elevator down to eject the first loaded pallet,

moving means for moving the transverse carriage means including the transfer plate means from the ready position to the loading position for introduction and support in the bay of an unloaded second pallet in the bay and for at least partial loading of the second pallet during ejection of the first pallet following completion of loading of the first pallet and prior to return of the elevator to the elevated position where it replaces the transfer plate means as support for the second pallet for continued loading of the second pallet,

whereby the moving means can return the transverse carriage means including the transfer plate means from the loading position to the ready position for receiving a third pallet and the device can repeat its cycle of operation.

B1 4,575,330 (1177th)

APPARATUS FOR PRODUCTION OF THREE-DIMENSIONAL OBJECTS BY STEREOLITHOGRAPHY

Charles W. Hull, Arcadia, Calif., assignor to UVP, Inc.

Reexamination Request No. 90/001,611, Sep. 28, 1988.
Reexamination Certificate for Patent No. 4,575,330, issued Mar. 11, 1986, Ser. No. 638,905, Aug. 8, 1984.
Int. Cl.[4] B29C *35/08;* **G03C** *9/08*
U.S. Cl. 425—174.4

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **2** and **27–29** are determined to be patentable as amended.

Claims **3–26** and **30–47**, dependent on an amended claim, are determined to be patentable.

1. A system for producing a three-dimensional object from a fluid medium capable of solidification when subjected to prescribed synergistic stimulation, said system comprising:

a container holding said fluid medium, said medium being sufficiently absorptive of solidifying radiation to enable formation of an adequately cohesive layer of structure capable of being partially unsupported by any other layer of structure during formation;

means for drawing upon and forming successive cross-sectional laminae of said object at a two-dimensional interface [and] *of said fluid medium defining a designated working surface, said laminae including a first cross-sectional layer of structure at said working surface;*

means for automatically recoating over the entire said first cross-sectional layer of structure with a body of fluid and decreasing a substantial portion of said body of fluid in thickness from a fluid layer of excess fluid thickness to a successive fluid layer of less thickness in preparation for formation of a second cross-sectional layer of structure adhered to said first cross-sectional layer; and

means for moving said [cross-sections] *cross-sectional layers* as they are formed and building up said object *from a plurality of successively adhered layers of structure* in step wise fashion, whereby a three-dimensional object is extracted from a substantially two-dimensional surface.

B1 4,650,418 (1178th)

DENTAL RESTORATION SHADING

John J. Blair, York, and Roger C. Shue, Red Lion, both of Pa., assignors to Dentsply Research & Development Corp., Milford, Del.

Reexamination Request No. 90/001,567, Jul. 25, 1988.
Reexamination Certificate for Patent No. 4,650,418, issued Mar. 17, 1987, Ser. No. 724,330, Apr. 17, 1985.
Continuation-in-part of Ser. No. 576,100, Feb. 1, 1984, abandoned.

Int. Cl.[4] A61C *13/08*

U.S. Cl. 433—203.1

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **1** is confirmed.

Claims **2–4, 7, 10, 12–14, 17, 19–21, 23–25, 30–32, 36,** and **37** are determined to be patentable as amended.

Claims **5, 6, 8, 9, 11, 15, 16, 18, 22, 26–29,** and **33–35,** dependent on an amended claim, are determined to be patentable.

1. A dental prosthetic facing comprising an outer shader layer; an intermediate at least substantially uncolored translucent layer; and an opaque substrate color keyed with said shader layer to match a shade guide.

REISSUES

DECEMBER 19, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,130

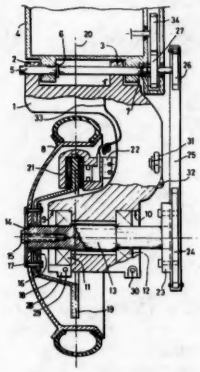
SUPPORTING ARM ASSEMBLY FOR A DRIVING WHEEL OF AN AUTOMOTIVE VEHICLE

Andre de Cortanze, Elf, France, assignor to Elf France, Paris, France

Original No. 4,553,622, dated Nov. 19, 1985, Ser. No. 528,582, Sep. 1, 1983. Application for reissue Nov. 17, 1987, Ser. No. 121,462

Int. Cl.[4] B60G *7/02*

U.S. Cl. 180—227 **19 Claims**



1. An oscillating supporting arm assembly for the driving wheel of a motorcycle, comprising an arm mounted to oscillate angularly about a connecting shaft of said motorcycle and cooperating with suspension means [between said arm and motorcycle], said wheel being removably fixed to a supporting shaft on one side of the free end of the supporting arm, the supporting shaft extending through said arm on [two bearings] *bearing means*, a wheel driving pinion is fixed to the supporting shaft, on the side of the arm opposite to the wheel and is driven by a chain mechanically connected to the driving means of the motorcycle, said supporting arm having the configuration of a U with two legs between which the rim and the tire of said [rear] *driving* wheel are located, one of the legs having hinge connections which cooperate with the connecting shaft of the motorcycle, *wherein* said wheel has its median plane extending at substantially equal distances from the two hinge connections *located at both ends of one leg* of the *U-shaped* supporting arm, the wheel is [rigidly] connected to a brake [disc] *surface* cooperating with brake tightening means [fixed to said supporting arm] and wherein the brake [disc] *surface* is mounted substantially on the longitudinal axis of the motorcycle *substantially* coinciding equally with the [transverse] median plane of the wheel so as to limit the torsion of the supporting arm and the reactions to the braking forces, *the supporting shaft extending through the other free leg of the U-shaped arm on bearing means located on said free leg between the wheel and the driving pinion, the wheel presenting an enveloping cross-section so as to mostly surround the free leg of the U-shaped arm.*

Re. 33,131

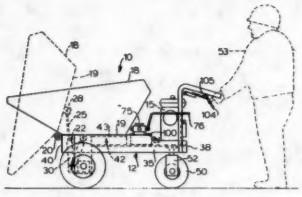
MOTORIZED DUMPING VEHICLE

Donald R. Morrison, 6228 Eagle Peak Dr., Charlotte, N.C. 28214

Original No. 4,645,264, dated Feb. 24, 1987, Ser. No. 690,460, Jan. 10, 1985. Application for reissue Feb. 29, 1988, Ser. No. 162,401

Int. Cl.[4] B60H *1/22*

U.S. Cl. 298—1 H **5 Claims**



3. A motorized dump-type vehicle for on-the-job transporting of concrete or other materials, comprising:

(a) a rectangular metal formed chassis frame having integrally-joined side, front and rear members defining in transit front end rear ends thereof;

(b) a gasoline engine mounted above and on the rear end of said frame;

(c) an open top dump container having side and bottom walls with at least the bottom wall being formed of a heat conducting material, said container being supported on said frame forwardly of said engine and having a bottom front end portion pivotally mounted on the front end of said frame;

(d) a pair of oppositely positioned hydraulic drive motors secured to said frame below the front end thereof;

(e) a pair of front driving ground-engaging wheels located on opposite sides of said frame front end and each said wheel being drivingly connected to a respective said hydraulic drive motor enabling said wheels to be driven thereby;

(f) a single hydraulic piston/cylinder having one end pivotally mounted on said frame centrally of the width thereof and the opposite end pivotally connected to the bottom wall of said container centrally of the sides thereof enabling said container to be raised and lowered by admitting pressurized fluid to one side or the other of said piston/cylinder;

(g) rear ground-*engaging wheel means mounted below and centrally of the rear end of said frame on support means enabling said rear wheel means to swivel about a vertical axis passing through said support means and through said engine for steering said vehicle;*

(h) a hydraulic fluid tank secured to said frame between the side members thereof and structurally reinforcing said frame, said tank having an input connection for receiving and storing heated hydraulic fluid and an output connection for withdrawing fluid to be pumped, said tank having a top wall formed of heat conducting material positioned so as to be immediately below and covered by the bottom wall of said container when said container is in its transport position thereby enabling heat stored in said tank to be dissipated through said heat conducting tank top wall and heat conducting bottom wall of said container and transferred to cooler material being transported in said container;

(i) an adjustable dump oil mounted on said frame and drivingly connected to said engine, said pump having a pump input

connecting to the output connection of said tank and a pump output connection; and

(f) a hydraulic valve and conduit system connected between said pump output connection and said tank input connection including a first lever-controlled valve connected by conduit to said piston/cylinder for raising and lowering said container and a second lever-controlled valve connected by conduit to said hydraulic drive motor means for forward and reverse driving of said front wheels.

Re. 33,132

1,5-DIPHENYL DERIVATIVE OF 1H-1,2,4-TRIAZOLE-3-CARBOXAMIDE AND HERBICIDE CONTAINING THE SAME

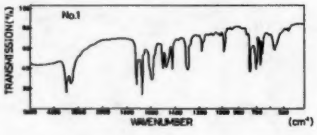
Katsumichi Aoki; Yoichi Kanda; Keigo Satake, and Hiroyasu Shinkawa, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Original No. 4,492,597, dated Jan. 8, 1985, Ser. No. 379,944, May 19, 1982. Application for reissue Dec. 9, 1986, Ser. No. 940,721

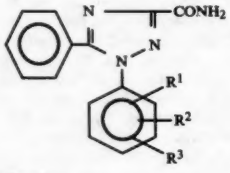
Claims priority, application Japan, May 25, 1981, 56-77967; May 25, 1981, 56-77968

Int. Cl.[4] A01N *43/64*; C07D *249/10*

U.S. Cl. 71—92 **11 Claims**



1. A [1,5-disubstituted-1,2,4-triazole-3-carboxamide] *1,5-disubstituted-1H-1,2,4-triazole-3*-carboxamide having the formula:



wherein R^1 is an atom of fluorine or chlorine, a methyl group or a trifluoromethyl group; R^2 is an atom of chlorine or a methyl group; and R^3 is an atom of hydrogen or a methyl group.

Re. 33,133

NEGATIVE ELECTRODE FOR LEAD ACCUMULATORS

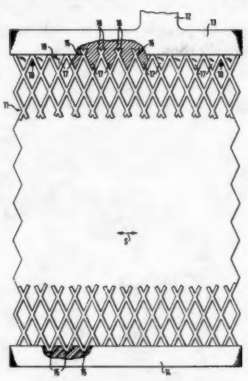
Reiner Kiessling, Anröchte, Fed. Rep. of Germany, assignor to Hagen Batterie AG, Fed. Rep. of Germany

Original No. 4,554,228, dated Nov. 19, 1985, Ser. No. 597,668, Apr. 6, 1984. Application for reissue Nov. 18, 1987, Ser. No. 123,592

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1983, 3312550

Int. Cl.[4] H01M *4/74*

U.S. Cl. 429—242 **26 Claims**



1. In a negative electrode for lead accumulators in the form of a rectangular expanded metal grid plate of copper having upper and lower ends forming upper and lower crossing points of said grid which serves as a carrier for an active mass and for current supply and extraction, the direction of stretching of the expanded metal extending parallel to an end of the rectangular grid plate at which a connection lug is provided, and wherein a lead strip, unitary with [a] *the* connection lug, is conductively secured to [one] *said* end of said grid plate over the whole length thereof, *the* improvement wherein *said copper grid is covered with a galvanically applied layer of a lead-tin alloy and* the lead strip is cast onto the grid plate [and said copper grid is covered by a lead or] *on top of the previously galvanically applied* lead-tin alloy layer, *and wherein the end regions of the grid plate which are either cast with lead or surrounded by a synthetic material, are pressed flat in a plane to form the grid plate prior to the casing of the lead and application of the synthetic material respectively.*

PLANT PATENTS

GRANTED DECEMBER 19, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,075

PLUM TREE, "RANCHO CINCO"

John M. Garabedian, P.O. Box 7883, Fresno, Calif. 93747

Filed Nov. 7, 1988, Ser. No. 268,269

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—38 1 Claim

1. A new and distinct variety of Plum Tree substantially as illustrated and described and which produces fruit which are somewhat remotely similar to the fruit borne by the Westerner Plum Tree (U.S. Plant Pat. No. 5,609) and the Gar Fantasy Plum Tree (U.S. Plant Pat. No. 5,178), but which is distinguished therefrom, and characterized principally as to novelty by bearing semi-freestone fruit which are ripe for commercial harvesting and shipment approximately August 6 through August 20 under the ecological conditions prevailing in Fresno, Calif., the subject variety producing fruit which have a distinct oblong shape, a dark red flesh color and an excellent flavor.

7,076

PLUM TREE, GAR-RED

John M. Garabedian, P.O. Box 7883, Fresno, Calif. 93747

Filed Nov. 7, 1988, Ser. No. 268,346

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—38 1 Claim

1. A new and distinct variety of plum tree, substantially as illustrated and described and which produces fruit which are somewhat remotely similar to the fruit borne by the Gar Fantasy Plum Tree (U.S. Plant Pat. No. 5,178) but which is distinguished therefrom and characterized principally as to novelty by bearing semi-freestone fruit which are ripe for commercial harvesting and shipment approximately August 10 through August 15 under the ecological conditions prevailing in Fresno, Calif., the subject variety producing fruit which have an attractive light red skin color, and a pink colored flesh.

7,077

ALSTROEMERIA PLANT NAMED GOLDEN DELIGHT

Frank Goemans, Chichester, England, assignor to Wuelfinghoff Freesia B.V., Netherlands

Filed Jan. 6, 1989, Ser. No. 294,254

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of Alstroemeria plant named Golden Delight, as illustrated and described.

7,078

ALSTROEMERIA PLANT NAMED APOLLO

Frank Goemans, Lagness, England, assignor to Wuelfinghoff Freesia B.V., Netherlands

Filed Jan. 6, 1989, Ser. No. 294,260

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of Alstroemeria plant named Apollo, as illustrated and described.

7,079

ALSTROEMERIA PLANT NAMED CAVALIER

Frank Goemans, Chichester, England, assignor to Wuelfinghoff Freesia B.V., Netherlands

Filed Jan. 6, 1989, Ser. No. 294,261

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of Alstroemeria named Cavalier, as illustrated and described.

7,080

DISTINCT VARIETY OF GERANIUM PLANT NAMED ISABELL

Christa Hofmann, Dresden, German Democratic Rep., assignor to Oglevee Ltd., Connellsville, Pa.

Filed Jan. 18, 1989, Ser. No. 298,512

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant characterized by a self-branching, upright plant of excellent conformation, a dark green foliage with a scarlet bloom color, and numerous longlasting, non-shattering flower clusters substantially as herein shown and described.

7,081

WORLD FEEDER BERMUDA GRASS

Louis R. Gordon, P.O. Box 516, Bethany, Okla. 73008

Filed Dec. 5, 1988, Ser. No. 280,227

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—88 1 Claim

1. A new variety of Bermuda grass as shown and described.

PATENTS

GRANTED DEC. 19, 1989

ERRATA

For CLASS	See PATENT NO.
108-044	4,887,526
606-005	4,887,529
606-005	4,887,593
606-061	4,887,595
606-061	4,887,596
606-180	4,887,598
606-180	4,887,599
606-128	4,887,600
606-219	4,887,601
604-385	4,887,602
606-159	4,887,613
114-267	4,887,654
226-109	4,887,778
141-001	4,887,857
407-110	4,887,945
410-032	4,887,946
410-144	4,887,947
411-005	4,887,948
411-121	4,887,949
411-302	4,887,950
411-371	4,887,951
411-466	4,887,952
414-331	4,887,953
414-401	4,887,954
110-263	4,887,962
493-213	4,887,973
209-167	4,888,106
552-248	4,888,137
562-555	4,888,138
562-840	4,888,139
424-001	4,888,163
424-063	4,888,164
424-677	4,888,182
423-087	4,888,207
503-214	4,888,334
518-700	4,888,361
521-120	4,888,371
526-279	4,888,392
525-423	4,888,407

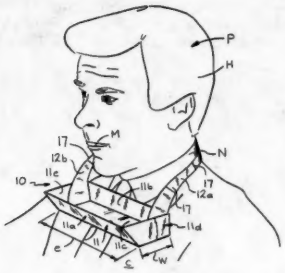
340-812 4,888,599
341-024 4,888,600
357-081 4,888,637
367-030 4,888,740
372-002 4,888,776
372-038 4,888,777
388-838 4,888,813
324-439 4,888,818
358-192 4,888,819
361-313 4,888,820
363-021 4,888,821
379-130 4,888,822
381-043 4,888,823
324-061 4,888,824

PATENTS

GRANTED DECEMBER 19, 1989

GENERAL AND MECHANICAL

4,887,315
FOOD SPILL CATCHING AND SERVING DEVICE
William J. Bezdek, 2861 Hagadorn Rd., Mason, Michigan 48854
Filed Mar. 20, 1989, Ser. No. 325,528
Int. Cl.[4] A41B *13/10*; A41D *13/04*
U.S. Cl. 2—49 A **15 Claims**

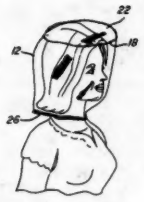


1. A protective device for collecting food spills to be positioned on a front body portion of a person in an upper chest area to catch the spills from the mouth of the person while seated in a moving vehicle which comprises:

(a) a rigid tray having a bottom, a front side away from the body portion, a back side adjacent to the upper chest area and opposite ends connecting the sides and the bottom to form the tray with a recess inside the tray for catching spills; and

(b) a strap means provided on the tray as side extensions from the bottom which extend to and fasten around the neck of the person, wherein in use food falls from the mouth by gravity into the recess in the tray while the person is seated in the moving vehicle.

4,887,316
HOOD-TYPE GARMENT
Rose P. Morandini, 8214 21 Mile Rd., Utica, Mich. 48087
Filed Feb. 21, 1989, Ser. No. 313,094
Int. Cl.[4] A42B *1/04*
U.S. Cl. 2—174 **6 Claims**



1. A hood-type garment for protecting hair and makeup while dressing comprising:

(a) a first rectangular piece of material having an upper edge, a lower edge and opposed ends, the ends of the material being releasably joinable to form a cylindrical shape for placement about the face and hair of a user;

(b) a second piece of material, the second piece being circular and which is secured along its circumference to the upper edge of the first piece to form a top section;

(c) means for releasably joining the opposed ends of the first piece at the point at which it is joined;

(d) means for tightening the lower edge of the first piece about the neck of a user.

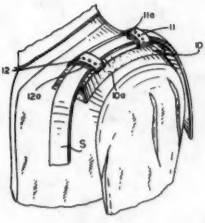
4,887,317
COLD WEATHER SYSTEM
James G. Phillips, Sr., Albuquerque, N. Mex.; James G. Phillips, Jr., Pleasant Grove, Utah; Joanne Harlow, and Gordon K. Scott, both of Orem, Utah, assignors to Burlington Industries, Inc., Greensboro, N.C.
Division of Ser. No. 91,242, Aug. 31, 1987, Pat. No. 4,843,647.
This application Feb. 10, 1989, Ser. No. 308,457
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—243 R **2 Claims**

1. A method of protecting oneself in cold weather, high wind conditions comprising the steps of:

wearing garments that normally provide sufficient cold weather protection for comfort in non-high wind situations; and

when the wind is high, placing a shirt and pants over the cold weather garments, the wind garments comprising material having a high moisture vapor transmission rate, and a low air porosity.

4,887,318
SHOULDER PAD
Robert L. Weinreb, 503 Broadway, New York, N.Y. 10012
Filed Mar. 3, 1989, Ser. No. 319,259
Int. Cl.[4] A41D *27/26*
U.S. Cl. 2—268 **12 Claims**



1. A one piece elongated shoulder pad comprised of a rubbery material for use with a shoulder strap, which comprises a base having a top, a bottom, and opposed first and second longitudinally extending sides, said first side being narrower than said second side, and at least one pair of opposed flexible cooperating tab means for retaining said shoulder strap on said pad, said tab means being integrally attached to and extending

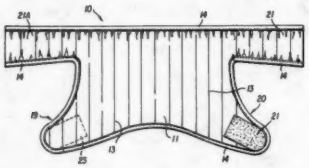
away from said base, said tab means each including cooperating fastening means for detachably fastening said tab means together, whereby said shoulder strap is retained under said tab means and on said top when said tab means are detachably fastened together.

4,887,319

UNITARY CONTIGUOUS FACE AND NECK PROTECTOR ALL WEATHER COVER FOR HARD HEAD GEAR

Darleen Daniels, P.O. Box 1221, Port Neches, Tex. 77651

Filed Sep. 21, 1988, Ser. No. 248,947
Int. Cl.[4] A42B *3/00*
U.S. Cl. 2—410 **1 Claim**



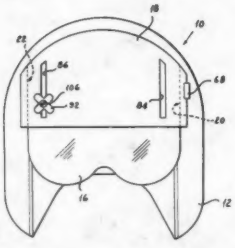
1. For use with hard head gear having a brim a weather protective unitary contiguous one piece outer covering comprising an inelastic deformable singular unitary face and neck portion of non-stretchable thermally lined water proof nylon having a colored outer surface, said cover having a top bridge portion adapted to overlie the brim of the hard head gear above the face of the wearer and terminating in side flaps adapted to be fastened beneath the chin of the wearer, waterproof elastic piping secured about the free edge of said cover adapted to cause the cover to seat tightly about the hard hat exterior with which it is in contact as well as to seat tightly about the face and neck of the wearer to shut out weather elements and the like from contact with the hard head gear wearer over the area covered by said unitary face and neck cover and means on said side flaps for securing the terminal ends of said flaps beneath the chin of the wearer.

4,887,320

DUAL-VISOR ASSEMBLY WITH SELECTIVE LEFT-HANDED OR RIGHT-HANDED ACTUATION

Richard J. Long, Lake Ariel, and Joseph J. Zaccone, Carbondale, both of Pa., assignors to Gentex Corporation, Carbondale, Pa.

Continuation of Ser. No. 68,835, Jul. 1, 1987, abandoned. This application Oct. 5, 1988, Ser. No. 253,943
Int. Cl.[4] A42B *3/02*
U.S. Cl. 2—424 **20 Claims**



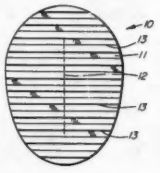
1. A visor assembly for a helmet including in combination a visor and an actuator for moving said visor between raised and lowered positions relative to the wearer's face, said visor having means on each side thereof for securing said actuator to that side, said actuator being adapted to be secured to one side of said visor by means of the securing means on said side, said actuator being adapted to be removed from said one side and secured to the other side of said visor by means of the securing means on said other side.

4,887,321

SANITARY TOILET SEAT COVER

Mary MacLean, 7315 - 1st Street, Burnaby, B.C., Canada (V3N 3S7)

Continuation of Ser. No. 671,068, Nov. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 409,512, Aug. 19, 1982, abandoned. This application Mar. 26, 1986, Ser. No. 843,840
Claims priority, application Canada, Jul. 29, 1982, 408352
Int. Cl.[4] A47K *13/14*
U.S. Cl. 4—243 **8 Claims**



1. A compact, disposable, paper toilet seat cover comprising a water-impermeable, very light weight, easily disposable, paper, said paper being in the form of a porous paper coated only on the reverse side thereof which is adapted to face a toilet bowl when in use with a water-repellant material, thereby retaining a porous paper surface for contact with the user while rendering the paper as a whole water impermeable and non-porous, said paper being provided with a one and only, slit, perforation, or line of weakness, consisting of a single, central such straight-line longitudinal opening, extending about 40% of the length of said paper, said paper being completely free of all other slits, perforations or lines of weakness, said paper then being folded longitudinally along said opening and then being folded transversely in a zig-zag or back-and-forth accordion-type fold at least within the region of the central longitudinal opening to a size of about one-fortieth of the unfolded sheet; said toilet seat cover having peripheral edges which are adapted to be folded under a toilet seat on which said toilet seat cover is placed; and an unstructured, randomly-defined aperture being formable therethrough by the sole application of body pressure thereto while sitting on said toilet seat cover, said aperture originating from said one and only, central, straight-line, longitudinal opening by tearing of said opening; whereby accurate positioning of said one and only, central, straight-line, longitudinal opening over the center of the hole in the toilet seat is rendered redundant.

4,887,322

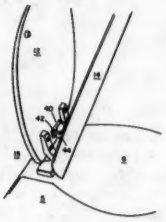
AUTOMATIC TOILET SEAT LOWERING APPARATUS

Lydon, 91 Main St., Concord, Mass. 01742

Filed Apr. 1, 1987, Ser. No. 32,598
Int. Cl.[4] A47K *13/10*
U.S. Cl. 4—251 **8 Claims**

1. In combination with a toilet having a bowl, a hinge mounted on said bowl, an apertured seat mounted on said hinge, a seat cover mounted on said hinge, and a support member mounted in fixed relationship to said bowl and adapted to support said cover and said seat when in the raised position, compression means adapted to be compressed only when said seat cover and seat are mutually adjacent and to prevent said seat from remaining in the raised position unless

held there by human intervention, said compression means being mounted on said cover in proximity to said hinge, said compression means being small enough so as not to interfere with use of said toilet and large enough to be compressed by said seat when in the raised position, said compression means



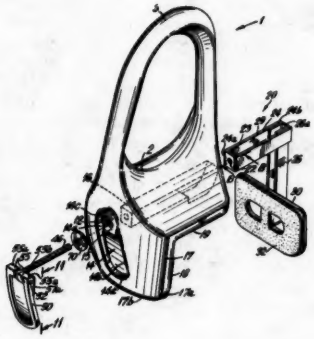
having resiliency adapted to the pressures characteristic of mechanical advantage inherent in its proximity to said hinge and thus being sufficient so that, when said seat is released from its raised position, said compression means immediately repels said seat away from said cover and past the position of unstable vertical equilibrium.

4,887,323

BATHTUB HAND RAIL

Fred DiVito, Asharoken, and Christopher I. Beal, Lindenhurst, both of N.Y., assignors to Lumex, Inc., Bay Shore, N.Y.

Filed Nov. 17, 1988, Ser. No. 272,636
Int. Cl.[4] A47K 3/022
U.S. Cl. 4—577
14 Claims



1. A bathtub hand rail for use on a bathtub side wall, the hand rail comprising:

a body comprising a hand-grip portion and a bottom portion, said bottom portion having a lip extending downwardly therefrom, and said bottom portion having a longitudinal slot extending therethrough, said lip having

a first surface adapted for placement against a first side surface of the bathtub side wall, and

a second surface having a recess portion;

a clamp arm assembly comprising a press plate adapted for placement against a second side surface of the bathtub side wall;

a locking handle having a maximum length dimension less than a minimum length dimension of the recess and having a maximum width dimension less than a minimum width dimension of the recess;

means for connecting the locking handle to the press plate through the longitudinal slot wherein rotation of the locking handle draws the press plate against the second side surface of the bathtub side wall, thereby securing the hand rail to the bathtub side wall; and

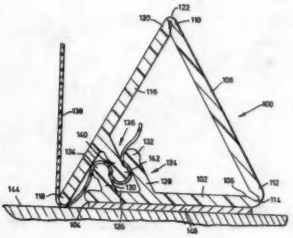
means for seating the locking handle in the recess.

4,887,324

CURTAIN RETAINING APPARATUS

H. Ross Cairns, 2474 Sir Carodoc Lane, Mississauga, Ontario, Canada (L5K 2J6)

Continuation-in-part of Ser. No. 219,571, Jul. 15, 1988, abandoned. This application Jan. 12, 1989, Ser. No. 296,147
Int. Cl.[4] A47K 3/22
U.S. Cl. 4—609
8 Claims



1. A one-piece clip for retaining shower curtains, the clip being of constant cross-section and comprising:

a first arm having two parallel edges,

a second arm having two parallel edges, one of which is integrally connected by a living hinge to said first arm at one edge of the latter, the other edge of the first arm being free,

a third arm having two parallel edges, one of which is integrally connected by a living hinge to the other edge of the second arm, the other edge of the third arm being free,

one of said first and third arms having integral structure defining a groove adjacent the free edge thereof,

the other of said first and third arms having integral structure defining a rib adjacent the free edge thereof, the rib being receivable and retainable in said groove with a shower curtain interposed between them,

the third arm being constructed such that, when said rib engages said groove with the plane of a shower curtain extending perpendicular to a wall surface and the first arm is affixed to said wall surface, the free edge of the third arm terminates substantially at said wall surface so as to position said shower curtain against said wall surface.

4,887,325

PATIENT POSITIONING APPARATUS

Charles V. Tesch, 2016 Cenwood, Jonesboro, Ark. 72401

Filed Jul. 13, 1989, Ser. No. 379,104
Int. Cl.[4] A61G 7/10
U.S. Cl. 5—84
5 Claims

1. Apparatus for repositioning and/or lifting a patient in a bed comprising

first and second upright members rigidly secured to the foot and head of said bed;

a horizontal member rigidly secured to the upper ends of said upright members, and extending longitudinally the length of bed;

a hoist attached to said horizontal member by means of a movable clamp;

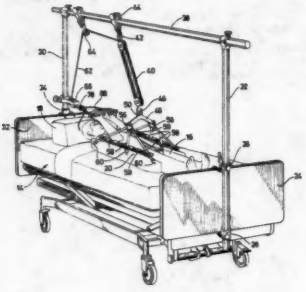
a spreader bar adapted to be connected to and supported by said hoist, and having means at the ends thereof for receiving and supporting straps;

a plurality of adjustable straps supported at each end of said spreader bar by use of an "O" ring, each said strap also

passing through a strap spreader and having connecting means at the other end thereof;

a draw sheet positioned beneath said patient and adapted for connection to said connecting means at the ends of said straps;

a pulley movably attached to said horizontal member positioned to receive a pull rope connected to said hoist;



a rope gripper/pulley attached to said second vertical member and positioned to receive said rope passing through said pulley;

a trapeze grip connected to said hoist rope and positioned to be reachable by said patient, whereby pulling on said trapeze provides a lifting and translating force on the patient which lifts the patient upwards and towards the head or center of the bed.

4,887,326

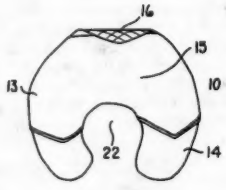
SUBOCCIPITAL PILLOW

Michael O'Brien, Boise; Lorie Leishman, Meridian, and Christine A. O'Brien, Boise, all of Id., assignors to Bax Associates, Boise, Id.

Filed Sep. 22, 1988, Ser. No. 247,533

Int. Cl.[4] A47G *9/00*; A61F *7/00*

U.S. Cl. 5—421 **2 Claims**



1. A suboccipital pillow for administering hot and cold treatments to the suboccipital region of a head, comprising:

a crescent shaped pillow having first and second surfaces;

a first crescent shaped pocket panel attached to said first surface, thereby defining a first pocket and having an insulating outer surface for protecting a user from potential burns and for slowing the rate of heat loss or absorbtion of a gel pack contained in said first pocket;

a second crescent shaped pocket panel attached to said second surface, thereby defining a second pocket;

a first tongue attached to an open side of said first pocket panel;

a second tongue attached to an open side of said second pocket panel;

fastening means for closing said first and second pockets;

a gel pack for insertion into either of said first or second pockets,

one of said first and second tongues being adapted to overlap the other of said first and second tongues, and further being adapted to be releasably fastened thereto, thereby closing said first and second pockets.

4,887,327

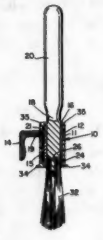
PAINT BRUSH FERRULE COVER

Angelo Meimeteas, 80 Getrude St., Lynn, Mass. 01902

Continuation-in-part of Ser. No. 127,467, Dec. 12, 1987, Pat. No. 4,821,361, which is a continuation-in-part of Ser. No. 85,362, Aug. 14, 1987, Pat. No. 4,751,762. This application Mar. 16, 1989, Ser. No. 324,198

Int. Cl.[4] A46B *17/00, 17/02*

U.S. Cl. 15—246 **2 Claims**



1. A hollow flexible rubber cover for a paint brush having a handle section, a bristle mounting section attached to said handle section, a ferrule surrounding said bristle mounting section and a bristle brush secured between said bristle mounting section and said ferrule which comprises a flexible cover being shaped to make a tight contact fit with the entire ferrule, said cover having a first opening of a size to permit insertion of a paint brush into said cover and to seal the interior of said cover against the ferrule to prevent liquid from entering said interior and a hook formed integrally with a rigid plate, said hook extending through a second small opening in said cover in a direction toward said bristles, said cover forming a liquid tight seal with said hook and said plate.

4,887,328

DEVICE FOR BRUSHING SEALING SURFACES OF ENCLOSURE ACCESS HOLES

Patrick E. L. Hanser, Yerres, France, assignor to Creation de Mecanismes, d'Automatismes et d'Asservissements, Epinay-sur-Orge, France

Filed Mar. 2, 1988, Ser. No. 163,348

Int. Cl.[4] A46B *13/02*

U.S. Cl. 15—246.5 **18 Claims**

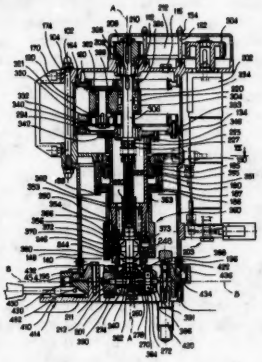
1. Device for brushing the sealing plane of access holes in enclosures, comprising:

an assembly adapted to be rotated about a main axis coaxial in use with said hole,

a mount at the end of said assembly,

a brush on said mount eccentric to said main axis and

adapted to be rotated about an axis transversely disposed relative to said main axis, and



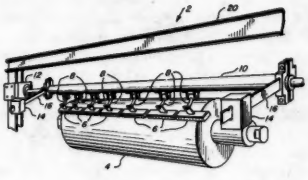
means for controlling the force with which said brush is applied to said sealing plane.

4,887,329

LOW PROFILE ROLL CLEANING APPARATUS AND SELF ALIGNING BEARING USED THEREIN

George C. Perneczky, 14032 S. Kostner, Crestwood, Ill. 60445

Filed Jul. 22, 1988, Ser. No. 222,773
Int. Cl.[4] D21G *3/02*
U.S. Cl. 15—256.53 **16 Claims**



1. An apparatus for automatically cleaning contaminants from a circulating surface having a surface width perpendicular to its direction of motion, comprising:

means for orienting at least one polishing block having a face parallel to said circulating surface along said surface width;

means for swingingly engaging said at least one polishing block with said circulating surface about a supporting axis of rotation; and

means for reciprocally scrubbing said circulating surface with each said polishing block along said entire circulating surface width.

4,887,330

WASHER ATTACHMENT FOR A SUCTION CLEANER

Michael B. Woodhall, Berkshire; Brian Gough, Middlesex, and Russell G. Wilcox, Berkshire, all of England, assignors to Shop-Vac Corporation, Williamsport, Pa.

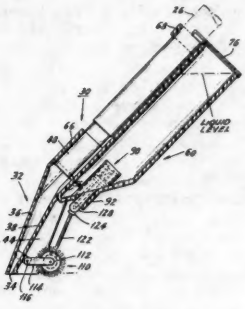
Filed Dec. 21, 1988, Ser. No. 287,905
Int. Cl.[4] A47L *7/00*
U.S. Cl. 15—322 **25 Claims**

1. A liquid dispensing attachment for a suction hose of a suction or vacuum cleaner comprising:

a suction nozzle having an inlet for intake of materials to be suctioned from a surface, the nozzle having an outlet away from the nozzle inlet, a fitting to which the nozzle outlet communicates and the fitting being connectable to a suction inlet of a suction cleaner for drawing a vacuum in the suction nozzle for generating suction at the nozzle inlet;

a dispensable liquid holding tank; means supporting the tank to the suction nozzle for forming a combined assembly of the suction nozzle and the tank;

dispensing means communicating with the tank for dispensing liquid from the tank during operation of the dispensing attachment with the nozzle inlet at a surface to be suctioned; the dispensing means comprising a dispensing



valve communicating into the tank, and means, which in response to the placement of the nozzle inlet at a surface for suctioning material from the surface, opens the valve for dispensing liquid through the valve from the tank;

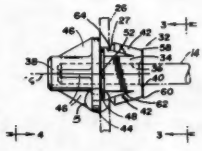
the dispensing means further comprising a dispenser connected with the dispensing valve, located externally of the tank and placed for dispensing the liquid in the vicinity of the nozzle inlet, whereby the attachment may be moved to move the nozzle inlet to the liquid for suctioning the liquid from the surface.

4,887,331

SELF-RETAINED ONE-PIECE PIVOT BUSHING

Robert M. Thomas, South Lyons, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed May 1, 1989, Ser. No. 345,337
Int. Cl.[4] F16L *5/00*
U.S. Cl. 16—2 **4 Claims**



1. In combination with a radially extending member supported for pivotal movement about the pivot axis of a pivot pin, said pivot pin engaged within a metal bracket having a pair of parallel raised panels, each said panel including a circular aperture aligned with said pivot axis defining outer and inner circular edges, pivot bushing means supporting each end of said pivot pin in an associated one of said apertures, the improvement comprising:

a pair of tubular one-piece bushings formed of plastic material, each said bushing having a body dimensioned to be axially received in one of said apertures in a self-retained manner, each said bushing body having a central bore one end of which is closed by an endwall;

at least one radially expanded peripheral flange unitarily formed on said body and having a diameter a predeter-

mined dimension greater than the diameter of its associated panel aperture;

each said bushing having a pair of fingers equidistantly spaced from each other about the circumference of its body, said pair of fingers protruding outwardly from and constructed unitarily with said body at a position axially spaced from its flange, and means for resiliently urging said fingers outwardly from said body;

each said bushing body formed with a radially expanded shoulder extending from said flange axially toward said aperture with its periphery having an exterior cone surface defining a predetermined cone angle and dimensioned to correspond with the size of its associated aperture with the cone surface engaged by its associated aperture outer circular edge so as to retain its central bore in a fixed radial position with respect to its aperture;

upon said pivot pin being generally aligned on said pivot axis such that each end thereof extends through an associated panel aperture wherein the open end of each said bushing body is inserted through its associated aperture whereby each pivot pin end is telescopically received in its associated bushing central bore while its fingers are temporarily deflected radially inwardly toward its tubular body such that its associated panel is received between its peripheral flange and its fingers; and

whereby upon each bushing pair of fingers being resiliently deflected radially outwardly to their normal position thereby exerting an axial force providing biting engagement of each aperture outer circular edges on its associated cone surface thereby preventing the removal of said pivot bushings and said pivot pin from said raised panel apertures.

4,887,332

SEMI-AUTOMATIC STUFFING MACHINE, CASING BRAKE AND TURRET ASSEMBLY

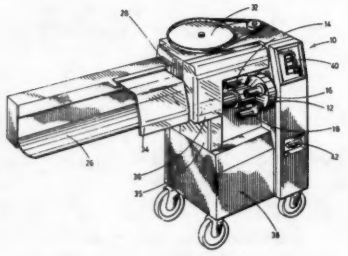
Alfred J. Evans, Raleigh, and R. Clay Dunigan, Benson, both of N.C., assignors to Delaware Capital Formation, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 251,667, Sep. 29, 1988. This application Oct. 28, 1988, Ser. No. 263,681

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.[4] A22C *11/04*

U.S. Cl. 17—35 **3 Claims**



1. In a stuffing machine a stuffing horn and casing brake combination comprising: a stuffing horn defining a discharge opening, adapted to receive casing, and having a first horn segment and a second horn segment, the first horn segment having first-horn-segment outer dimensions and the second horn segment having second-horn-segment outer dimensions which are reduced in comparison to the first-horn-segment dimensions:

casing brake means for intermittently braking the movement of casing from the stuffing horn past the discharge opening by applying tension to the casing on the horn, having a first brake portion and a second brake portion, the first brake portion and the second brake portion having internal dimensions sized relative to the first-horn-segment outer dimensions and the second-horn-segment outer dimensions for applying tension to casing on the horn between the second brake portion and only the first horn segment, between the second brake portion and only the first horn segment, or between both the first and second brake portions and only the first horn segment, when either the first brake portion or the second brake portion is, or both portions are, in a braking position relative to the first horn segment;

the stuffing horn and casing brake means being mounted on the machine for movement relative to each other to and from a stuffing position of the casing brake means and the stuffing horn wherein the first brake portion and the second brake portions are both in a braking relative to the first horn segment and both cooperate with the first horn segment for applying tension to the casing, and to and from another position of the casing brake means and the stuffing horn wherein only the second brake portion is in a braking position relative to the first horn segment and only the second brake portion cooperates with the first horn segment for braking casing;

whereby a full braking may be applied to the casing by both brake portions and a reduced braking may be applied to the casing by only the second brake portion, which provides for full braking during product stuffing and reduced tension during product clipping;

the stuffing horn defining a discharge direction of product discharge, in which the first horn segment is more distant from the discharge opening than the second horn segment, in the direction opposite the discharge direction, and of a first outer diameter, and the second horn segment is adjacent the discharge opening and of a second outer diameter smaller than the first outer diameter;

the stuffing horn and casing brake means being mounted on the machine for movement from the braking position to the another position by movement of the stuffing horn a distance in the discharge direction greater than any movement of the casing brake means;

the stuffing horn and casing brake means being mounted on the machine for movement of both the stuffing horn and the casing brake means from the braking position in a distance opposite the discharge direction, the movement from the braking position to the another position being accomplished by movement of the stuffing horn a distance greater than movement of the casing brake means;

whereby the casing brake means is movable from its braking position to provide a partially voided area within the casing within the clipping zone and to provide clearance;

the casing brake means in the braking position being located in the clipping zone.

4,887,333

HARVESTING, SHUCKING AND EVISCERATING CLAMS AT SEA

William E. Gallant, Scarborough, Me., assignor to Borden, Inc., Columbus, Ohio

Division of Ser. No. 122,014, Nov. 17, 1987. This application Nov. 4, 1988, Ser. No. 267,367

Int. Cl.[4] A22C *29/04, 25/16*

U.S. Cl. 17—74 **15 Claims**

1. Apparatus for processing clams at sea and being located on a seagoing vessel, said apparatus comprising:

a hopper on deck for receiving harvested clams,

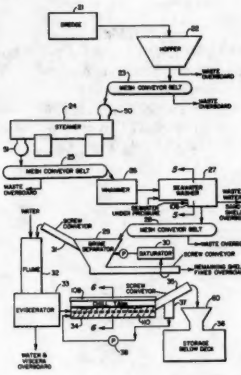
a first conveyor for receiving the clams from the hopper with means for directing waste overboard,

a steamer configured to receive the clams from the first conveyor, means for supplying steam to the steamer in an amount to cause the shells of the clams to open,

a second conveyor for receiving the clams from the steamer with second means for directing waste overboard, said

second conveyor having a discharge end at a crusher which receives the steamed clams from the second conveyor,

means for delivering clams from the crusher to a sea water washer, means for supplying water from the sea to the washer, means for removing waste from the washer and discharging it overboard,



an eviscerator on deck for receiving the washed clams from the washer, means for supplying water from the sea to the eviscerator, means for conducting overboard the separated viscera from the eviscerator, and

a chill tank for receiving the separated clam meat from the eviscerator.

4,887,334

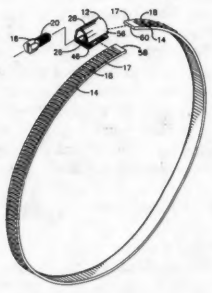
CLAMPING ASSEMBLY WITH SIDE ENTRY CONNECTION OF A CLAMP UNIT TO A BAND

George A. Jansen, Denver, and Hans R. Hinnen, Lakewood, both of Colo., assignors to Band-It-Idex, Inc., Denver, Colo.

Continuation of Ser. No. 167,006, Mar. 10, 1988, abandoned. This application May 8, 1989, Ser. No. 348,906

Int. Cl.[4] F16L *33/08*

U.S. Cl. 24—23 R **6 Claims**



1. A clamping assembly, comprising:

band means having a longitudinal extent and a lateral extent and having first and second ends, said band means being adapted to be clamped about an object;

clamping means joined to said band means for use in holding said band means about the object, said clamping means and said band means being joined together by a sidewise movement of at least one of said band means and said clamping means, said clamping means including:

a body having a length and a width,

a leg integral with said body,

an interior shelf having a lateral extension and a first surface and a second surface, said interior shelf also having one of a shelf portion and a side operatively formed to said body, and,

an exterior shelf having one of a shelf portion and a side operatively formed to said body, said exterior shelf having a width equal to or greater than said lateral extent of said band means whereby said exterior shelf provides a barrier between said band means and the object being clamped; and

wherein said body, said exterior shelf and said interior shelf are integrally formed from a single piece of material and each of said interior shelf and exterior shelf has a free edge with said free edge of said interior shelf being located adjacent to an inner surface of at least one of said body and said leg at the end of said lateral extension of said interior shelf and said interior shelf free edge being spaced both vertically and horizontally from said free edge of said exterior shelf.

4,887,335

CLOSURE FOR CLOSING PLASTIC BAGS AND THE LIKE

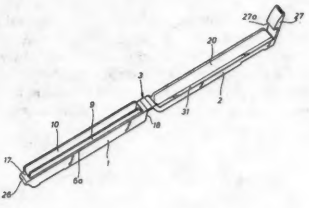
Jan Folkmar, Otelfingen, Switzerland, assignor to ICE-PACK Service AG, Otelfingen, Switzerland

Filed Nov. 15, 1988, Ser. No. 278,650

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1987, 3738881

Int. Cl.[4] B65D *77/10*

U.S. Cl. 24—30.5 R **7 Claims**



1. A closure for closing plastic bags or the like, comprising:

a first clamping leg having first and second ends and a length therebetween, a base and sidewalls joined thereto, which base and sidewalls together form a substantially U-shaped transverse cross-section defining a recess extending substantially the length of the first leg;

each sidewall including, in a plane of the sidewall, a lip having a thickness less than a thickness of the sidewall;

a distance between the sidewall planes defining an interior sidewall width for the first leg;

a second clamping leg having first and second ends and a length therebetween, a rib and sidewalls joined thereto, which rib and sidewalls form a substantially V shaped transverse cross-section extending substantially the length of the second leg;

a distance between a bag facing surface of said sidewalls of the second leg defining an exterior sidewall width for the second leg, said exterior sidewall width being greater than said interior sidewall width of the first leg;

the first end of the first leg being pivotally joined to the first end of the second leg such that in a bag closing position the first leg overlies and mutually engages the second leg with the bag facing surface of the sidewalls of the second leg lying within the recess of the first leg; and

a locking clamp for retaining the first and second legs in

mutual engagement in the bag closing position, the clamp including a first member attached to the second end of the first leg, and a second member attached to the second end of the second leg;

a bag to be closed being held between the bag facing surface of the sidewalls of the first leg and the bag facing sidewalls of the second leg when the closure is in the bag closing position.

4,887,336

CONVEYOR BELT CLAMP

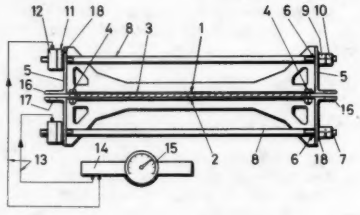
Robert J. Cann, Chilwell, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Oct. 21, 1988, Ser. No. 260,682

Claims priority, application United Kingdom, Nov. 5, 1987, 8725979

Int. Cl.[4] B30B *1/08*; F16G *3/00*

U.S. Cl. 24—37 **8 Claims**



1. A conveyor belt clamp comprising a pair of parallel plate-like members, a pair of parallel outwardly projecting arms located at or adjacent the ends of the plate-like members, securing means for the plate-like members arranged to hold them in use against a conveyor belt to be clamped between them and tensioning means; the tensioning means being connected to at least one of the pair of parallel outwardly projecting arms and being connected parallel to the width of the conveyor belt to apply through the arms a tension to cause the plate-like members to bend towards the other member.

4,887,337

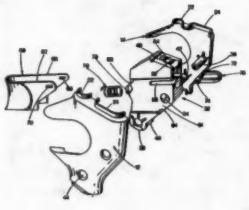
CORD CINCHING DEVICE

Brian Bateman, Orillia, Canada, assignor to Polytech Netting Industries, Mississauga, Canada

Filed Dec. 30, 1988, Ser. No. 292,097

Int. Cl.[4] F16G *11/00*

U.S. Cl. 24—136 R **6 Claims**



1. A cord cinch device comprising:

(a) an outer body having a cord entrance and a cord exit;

(b) means for channelling and gripping said cord when extending in said body between said entrance and said exit; said channeling and gripping means including an inner body secured to said outer body and displaying a wedge slot defining a pair of opposite gripping surfaces adjacent said cord exit; and

(c) unlatching means slidably mounted to said inner body for disengaging said cord when gripped in said surfaces; said unlatching means including a stirrup receiving said cord therethrough and being adapted, when said unlatching means are actuated, to release said cord from engagement in said gripping surfaces and a finger actuated U-shaped slide member; said stirrup being fixedly mounted to said slide member and cooperating therewith to release said cord from a cinched condition.

4,887,338

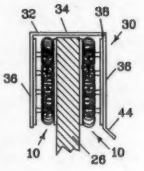
SHEAR TRAP HOOK AND LOOP FASTENING SYSTEM

Michael D. Handler, Norwalk, Conn., assignor to Velcro Industries B.V., Amsterdam, Netherlands

Continuation of Ser. No. 893,390, Aug. 5, 1986, abandoned. This application Feb. 19, 1988, Ser. No. 161,330

Int. Cl.[4] A44B *18/00*

U.S. Cl. 24—306 **29 Claims**



1. An improved fastening system wherein surfaces of two substantially rigid members are releasably secured to one another by means of a touch fastening system having two mating portions carrying engaging elements, such that engagement of said engaging elements of the mating portions of the touch fastening system position said surfaces of said members in substantially rigid parallel relation and confine said surfaces in a substantially fixed spaced relationship, which space is sufficiently less than the combined height of the engaging elements upstanding from both surfaces, wherein one of said members is configured to substantially surround at least a portion of the second member thereby creating the confinement of relative movement of said members and the progressive resistance of said engaging elements when said members are moved relative to each other, wherein the improvement comprises:

(a) two mating touch fastener portions, one of said touch fastener portions carrying a plurality of projecting engaging elements capable of releasably engaging cooperating projecting elements carried by the other of said touch fastener portions;

(b) a first member comprised of a hinged shear trap channel, said hinged shear trap channel having a rigid back portion interconnecting a pair of rigid opposed side portions, defining inwardly facing surfaces, with one of said touch fastener portions on each inwardly facing surface, said hinged shear trap channel having at least one of its side portions connected to said back portion by a hinge means, said shear trap channel being elongated in its longitudinal dimension; and

(c) a second member comprised of a substantially planar, self-supportingly rigid unitary fin member, said substantially planar rigid unitary fin member defining opposed outwardly facing surfaces and having the other of said touch fastener portions on its opposed outwardly facing surfaces, said fin member being of a shape such that said shear trap channel is capable of surrounding the portion of said fin member carrying said touch fastener portions in a closely-fitting manner;

whereby said hinged shear trap channel is capable of receiving said rigid unitary fin member between its inwardly facing surfaces with the two touch fastener portions en-

gaged to act in shear to connect said fin member and said shear trap channel together,

said rigid back portion being of a width such that the inwardly and outwardly facing surfaces are all substantially parallel to one another during said engagement, said width being sufficiently less than the combined height of said fin member and said touch fastener portions including their engaging elements,

and said at least one hinged side portion being pivotable by means of said hinge means away from said fin member to provide progressive disengagement of the two touch fastener portions when desired,

thereby providing an improved fastening system utilizing the substantial holding power of said system in the shear direction, while allowing disengagement of the members in the direction perpendicular to the surfaces of said members by operation of the hinged side portion of said hinged shear trap channel.

4,887,339

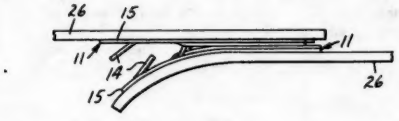
STRIP MATERIAL WITH TAB-LIKE PARTS FOR FORMING FASTENERS

Michael P. Bellanger, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 18, 1988, Ser. No. 220,265

Int. Cl.[4] A44B *17/00*

U.S. Cl. 24—575 **17 Claims**



1. An elongate stiff flexible strip of polymeric sheet material adapted to be cut into lengths to form releasably engageable pieces of a fastener, said strip having a plurality of equally spaced, aligned, similarly shaped and oriented, generally U shaped slits along its length, said slits defining a row of tab-like parts of said strip and a surrounding main part of said strip, each of said tab-like parts being bent along a bend line between the ends of the slit defining the tab-like part out of the plane of the main part of said strip to define an opening through said strip, said bend lines of said tab-like parts being parallel and extending transverse of said strip, and said main part and tab-like parts of the strip having adjacent edge surfaces adjacent the opposite ends of said slits disposed at an included angle in the range of about 60 to 90 degrees with respect to the adjacent bend line so that when the tab-like parts on each of two lengths of said strip are simultaneously fully inserted through the openings in the other length with the tab-like parts projecting generally in opposite directions, said edge surfaces of the tab-like parts on one length will make frictional engagement with said edge surfaces of the main part of the strip on the other to frictionally hold the lengths in releasable engagement.

4,887,340

ELASTIC FIXING ROLLER

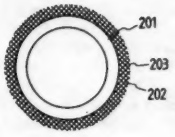
Chiaki Kato; Masaya Nishi, and Toshiyuki Hatta, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Oct. 19, 1988, Ser. No. 259,729

Claims priority, application Japan, Oct. 20, 1987, 62-266127; Oct. 31, 1987, 62-276985; Nov. 20, 1987, 62-294740; Dec. 30, 1987, 62-335073; Dec. 30, 1987, 62-335074

Int. Cl.[4] B21B *27/00*

U.S. Cl. 29—130 **7 Claims**



1. An elastic fixing roller for use in a fixing stage of a fixing apparatus such as a copying machine comprising:

a roller base member; and

a layer of porous fluorocarbon resin provided o.. the outer surface of said roller base member, said porous material havig porous portions impregnated with heat-resistant liquid rubber that hardens after impregnation, said porous material being formed by extending and baking said fluorocarbon resin filled with an inorganic filler having a particle size no larger than 5 μm to enlarge the pore size of said porous portions, said liquid rubber containing an inorganic filler and a releasing agent to provide heat-resistance, heat conductivity, electrical conductivity, and releasing properties.

4,887,341

METHOD AND APPARATUS FOR FITTING COMPONENT SECTIONS

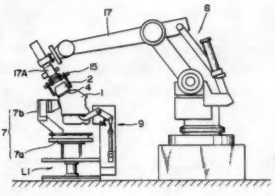
Hideharu Sakimori, Hiroshima; Yoji Komatsu, Yamagushi; Masahiro Ito, Akashi, and Nobuyoshi Ohkuma, Kashiwara, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 1, 1987, Ser. No. 91,934

Claims priority, application Japan, Sep. 1, 1986, 61-206550; Oct. 9, 1986, 61-241040

Int. Cl.[4] B23P *19/00, 21/00*; B25J *15/10*

U.S. Cl. 29—156.4 R **25 Claims**



1. A method of fitting a cylinder block and a cylinder head together at a plane which is inclined to the horizontal prior to rigidly fixing, and thereby assembling, said cylinder block and cylinder head with coupling bolts into a V-type automobile engine body having two series of cylinder bores in an automatic assembling line, said cylinder block and cylinder head being provided with mutually coacting locating means in their fitting surfaces to bring said cylinder block and cylinder head into proper registry, said method comprising:

placing a cylinder block at a predetermined position relative

to an automatic assembling line, said cylinder block being provided with an inclined fitting surface formed with coupling bolt engaging bores having a circular recess with a diameter larger than that of said engaging bores;

inserting coupling bolts through and protruding out of coupling bolt receiving bores formed in a fitting surface of a cylinder head placed at a preselected different position by means of a manipulator, said manipulator including gripping means having a plurality of clamping fingers for holding said coupling bolts;

setting the fitting surface of said cylinder head in juxtaposition to the fitting surface of said cylinder block by means of said manipulator while inserting the protruding portion of said coupling bolts into one of said circular recesses and said coupling bolt engaging bores;

mutually coacting said locating means of said cylinder block and said cylinder head to bring said cylinder block and said cylinder head into proper registry with said coupling bolts received in one of said circular recesses to couple said cylinder block and said cylinder head temporarily together; and

tightening said coupling bolts into said coupling bolt engaging means to rigidly fix said cylinder block and cylinder head together, whereby assembling them into one whole engine body.

4,887,342

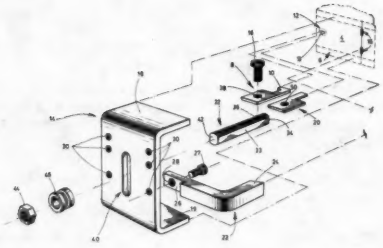
DEVICE TO FORCE OPEN THE DOOR OF A SAFETY DEPOSIT BOX

Jacques-André Lacoste, 52, 64ième Avenue, St-Eustache (Quebec), Canada J7P 3P3

Filed Nov. 8, 1988, Ser. No. 268,704

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—259 **5 Claims**



1. Device to force open the door of a safety deposit box having a lock, comprising:

a first key having an end terminated by a portion extending in a direction perpendicular to the longitudinal axis of said first key, said end being adapted to be inserted into the keyhole of said lock, said portion extending sufficiently in said direction so that said portion can rest against the interior surface of said door beyond the cylinder of said lock after that said first key has been inserted into said keyhole and laterally displaced with respect to said cylinder; and

pulling means for pulling said first key, said pulling means having a fastening means for securing said first key to said pulling means, and legs adapted to rest against a solid surface adjacent to said door which can be forced open by pulling said first key, while said portion rests onto the interior surface of said door, by means of said pulling means having said legs resting against said solid surface, said device further comprising a second key having an end adapted to be inserted into said keyhole, beside said first key, in a space created in said keyhole when said first key is laterally displaced, to lock said first key in a position where said portion rest against the interior surface of said door beyond said cylinder.

4,887,343

METHOD AND APPARATUS FOR ROLLER LEVELER

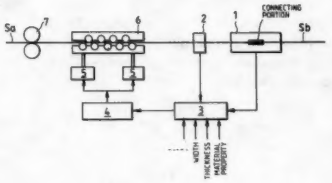
Hirohiko Ohishi, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 27, 1988, Ser. No. 199,722

Claims priority, application Japan, May 29, 1987, 62-131508; May 29, 1987, 62-131509; May 29, 1987, 62-131510

Int. Cl.[4] B21D *1/02*

U.S. Cl. 29—445 **9 Claims**



7. An automatic depression control method for a roller leveler in a roller leveler line, comprising the following steps:

connecting consecutive metal webs and providing a connecting completion signal so as to start said roller level line;

detecting a position of a junction of metal web on a roller leveler path, and providing a detection signal accordingly;

calculating an amount of adjustment for work rollers of said roller leveler in accordance with a material, thickness and width of said metal web;

issuing a first instruction signal, for moving work rollers of said roller leveler away from said metal web in said roller leveler, to a depression control unit when the junction of metal web enters said roller leveler;

issuing a second instruction signal based on said calculation, for causing said work rollers to press said metal web with a predetermined amount of adjustment, to said depression control unit when said junction of metal web passes through said roller leveler;

wherein said depression control unit operates automatically in response to said first and second instruction signals.

4,887,344

METHOD OF MOUNTING A TORQUE CONVERTER ON A TRANSMISSION

Haruto Kurihara, Hiroshima, and Koji Uchida, Higashihiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 27, 1989, Ser. No. 329,292

Claims priority, application Japan, Apr. 3, 1988, 63-81641

Int. Cl.[4] B23Q *3/00*

U.S. Cl. 29—468 **10 Claims**

7. A method of mounting a torque converter on a transmission, wherein said torque converter has a case which is provided with an engaging portion at its central part and in which a turbine runner provided at its central part with an engaging portion and a stator provided at its central part with an engaging portion are contained to be displaceable substantially in parallel within respective different ranges of displacement and said transmission has two tubular members disposed coaxially in such a manner that an end portion of an inner one of said two tubular members projects outward from an end portion of an outer one of said two tubular members and a shaft member extending at the inside of the inner one of said tubular members with its end portion projecting outward from the end portion of the inner one of said two tubular members, the method comprising the steps of:

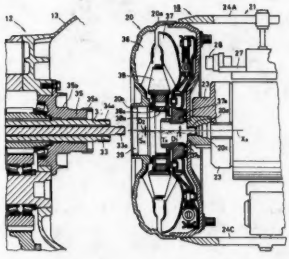
setting the transmission to have said two tubular members extending horizontally;

holding the torque converter by holding means which is movable in vertical and horizontal directions;

positioning the torque converter held by the holding means so as to cause an imaginary axis of one of said turbine runner and said stator to coincide with a common imaginary axis of said two tubular members of the transmission;

moving the torque converter held by the holding means toward the transmission in the horizontal direction so as to engage the engaging portion of one of said turbine runner and said stator, which has the imaginary axis positioned to coincide with the common imaginary axis of said two tubular members of the transmission, with the end portion of the inner one of said two tubular members of the transmission;

positioning further the torque converter held by the holding means so as to cause an imaginary axis of the other of said turbine runner and said stator to coincide with the common imaginary axis of said two tubular members of the transmission;



moving further the torque converter held by the holding means toward the transmission in the horizontal direction so as to engage the engaging portion of the other of said turbine runner and said stator, which has the imaginary axis positioned to coincide with the common imaginary axis of said two tubular members of the transmission, with the end portion of the outer one of said two tubular members of the transmission,

positioning still further the torque converter held by the holding means so as to cause an imaginary axis of the case to coincide with an imaginary axis of said shaft member of the transmission; and

moving still further the torque converter held by the holding means toward the transmission in the horizontal direction so as to engage the engaging portion at the central part of the case, which has the imaginary axis positioned to coincide with the imaginary axis of said shaft member of the transmission, with the end portion of the shaft member of the transmission.

4,887,345

TURRET APPARATUS

Kazuharu Saito; Masao Hiraguri; Sadao Yamada, and Junichi Shiozawa, all of Nagano, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho and Toto, Ltd., Japan

Filed Oct. 9, 1987, Ser. No. 106,308

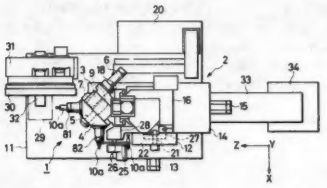
Claims priority, application Japan, Oct. 9, 1986, 61-241782; Oct. 20, 1986, 61-250578; Oct. 27, 1986, 61-256481

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **5 Claims**

1. A turret apparatus with an automatic tool changer characterized in that a turret head is rotatably provided on a body, said turret head having two main shafts arranged with an interval of 180 degrees about a rotary shaft, said two main shafts being disposed to form an angle of intersection of 90 degrees therebetween, a rotational axis of said turret head being horizontally directed, and each of said two main shafts being disposed to form an angle of intersection of 45 degrees with respect to said rotary shaft, one of said main shafts being in a working position for working on a workpiece when the other main shaft is in a stand-by position remote from said workpiece in relation to said working position, and an automatic tool changing arm and a tool stocker are arranged adjacent said other of said main shafts which is in the stand-by position,

wherein said turret apparatus further comprises a vertical guide for vertically guiding said tool stocker, means for moving said tool stocker and said tool changing arm



together with said turret head; means for index-rotating said turret head; means for positioning said turret head; driving means for rotatably driving said main shafts; clutch means disposed between said driving means and said main shaft; rotation-detaining means for preventing rotation of said one of said main shafts in said working position; means for actuating said rotation-detaining means in response to deactuation of said clutch means and for deactuating said rotation-detaining means in response to actuation of said clutch means; cam means for operating said index-rotating means, said clutches and rotation-detaining means, and said positioning means; a cam shaft on which said cam means is mounted; and a driving source for driving said cam shaft to rotate.

4,887,346

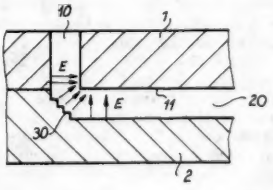
METHOD FOR MAKING AN ULTRA-HIGH FREQUENCY TRANSITION BETWEEN TWO ORTHOGAL GUIDED STRUCTURES AND ULTRA-HIGH FREQUENCY DEVICE WITH A TRANSITION OF THIS TYPE

Philippe Bertalan, Sceaux, France, assignor to Thomson-CSF, Puteaux, France

Filed Dec. 16, 1987, Ser. No. 133,736

Int. Cl.[4] H01Q *13/00*

U.S. Cl. 29—600 **3 Claims**



1. A method for making an ultra-high frequency transition between two orthogonal guided structures comprising the steps of:

in a first milling stage, cutting a face out of the block at the angle formed by a guiding wall of a first structure and a guiding wall of the structure orthogonal to the first structure, without any tilting of either structure, the guiding

walls having dimensions that are compatible with millimeter wavelengths, the walls being obtained by making guiding grooves in one of the structures, through milling, by controlling the milling tools so that it moves in to-and-fro motions in a plane along a first direction the face being obtained from a corner left at an end of said guiding groove,

controlling the milling tool, in a second milling stage, so that it moves along directions orthogonal to the first direction in and at different depths so that it creates steps in the corner throughout the entire width of the guiding groove.

4,887,347

METHOD OF PRODUCING A CONTACT SPRING STRUCTURE OF AN ELECTROMAGNETIC RELAY

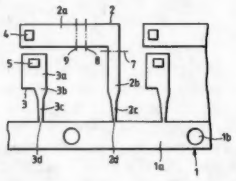
Hiroshi Hikita, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Aug. 22, 1988, Ser. No. 234,653

Claims priority, application Japan, Oct. 14, 1987, 62-259151

Int. Cl.[4] H01H *11/00*

U.S. Cl. 29—602.1 **3 Claims**



1. A method of producing a plurality of individual contact spring assemblies, each having a movable and a fixed contact spring, comprising:

providing a unitary sheet metallic blank having a longitudinally extending edge;

caulking a plurality of spaced first electrical contacts on one surface of the blank along a first path spaced a first predetermined distance from the longitudinally extending edge;

caulking a plurality of spaced second electrical contacts on said one surface along a second path extending substantially parallel to the first path and spaced a second predetermined distance from the longitudinally extending edge, each first contact being aligned with a corresponding second contact in a direction substantially perpendicular to the first and second paths;

stamping the unitary sheet metallic blank into a configuration wherein each of said first electrical contacts is located on each of a plurality of first spaced elongate spring members extending from between a third predetermined distance from the longitudinally extending edge to a fourth distance intermediate the first and second paths, and each of said second electrical contacts is located on a second portion on each of a plurality of second elongate spring members having a first portion extending in a direction substantially parallel to the first elongate spring members and spaced therefrom, and the second portion extending in the direction of the first and second paths;

bending each second elongate spring member along a first line parallel to and between the first and second paths for aligning the second electrical contacts in opposing relationship to the corresponding first electrical contacts;

bending each second portion of the second elongate spring members along parallel lines located intermediate the first portion and the second electrical contact and extending in a direction substantially perpendicular to the first line for spacing each second electrical contact from the corresponding opposing first electrical contact;

embedding the first and the second elongate spring members in a base for fixedly mounting the first and the second elongate spring members relative to one another; and

cutting the embedded sheet metallic blank along a line substantially parallel to the first and second paths adjacent the longitudinally extending edge for separating the individual contact spring assemblies from the metallic blank.

4,887,348

ALKALLINE CELL BATTERY AND METHOD FOR MANUFACTURE THEREOF

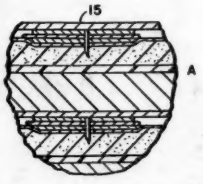
Pentti J. Tamminen, Kaskenkaatajantie 12 D, Espoo, Finland

Division of Ser. No. 165,975, Mar. 9, 1988, Pat. No. 4,816,354.

This application Sep. 23, 1988, Ser. No. 248,804

Int. Cl.[4] H01M *6/00*

U.S. Cl. 29—623.2 **3 Claims**



1. A method for fabricating an alkaline battery of the type wherein a plurality of cells are mounted in a stack, each said cells having a positive electrode, a negative electrode in the form of paste contained within a sealed bag, a dielectric positioned at least between the electrodes, a flexible package in which the electrodes and dielectric are sealed, a pointed conductor connected to the positive electrode of the cell and adapted to pierce the package and the negative electrode bag of an adjacent cell to make electrical contact with the negative electrode paste of such cell when the cells are pressed together, thereby electrically connecting the two cells and a supporting plate of a substantially stiff nonconducting material which may be easily punctured by a conductor mounted to the negative electrode side of the package, the pointed conductor of one cell of each adjacent pair of cells piercing the negative electrode bag, adjacent package and supporting plate of the other cell of the pair with means being provided for making electrical connection to the pointed conductor extending the cell at one end of the stack and for making electrical connection to the negative electrode of the cell at the other end of the stack, the method comprising the steps of:

stacking the negative electrode, dielectric and positive electrode in a plastic cup-shaped cell container;

vacuum sealing the cell container with a plastic top;

mounting the pointed conductor, either before or after the vacuum sealing step, to be in electrical contact with the positive electrode and to project through the plastic top, the three steps indicated above forming a battery cell;

coating adhesive on both sides of a stiff plastic material fed from a roll;

cutting the plastic material to form said supporting plates;

mounting a supporting plate to the side of each cell opposite the side from which the pointed conductor projects; and

stacking a predetermined number of said cells with the pointed conductor of one cell adjacent the supporting plate side of the next cell, the stacking being performed with sufficient pressure to cause the pointed conductor of each pair of adjacent cells to pierce the supporting plate, plastic top and negative electrode bag of the adjacent cell.

4,887,349

METHOD AND APPARATUS FOR MANUFACTURING ELECTRODE FOR BATTERY

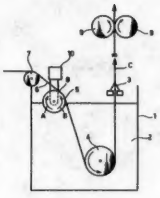
Makoto Kambayashi, Hyogo; Kensuke Nakatani, Sumoto; Kazuaki Ozaki, Sumoto; Masahito Tomida, Sumoto; Hiroshi Haraguchi, Hyogo, and Takeo Hamamatsu, Sumoto, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Jul. 29, 1988, Ser. No. 225,696

Claims priority, application Japan, Jul. 30, 1987, 62-191954; Nov. 24, 1987, 62-296486; Dec. 18, 1987, 62-322544

Int. Cl.[4] H01M *4/20*

U.S. Cl. 29—623.5 13 Claims



1. A method of manufacturing an electrode for a battery comprising:

preparing a substrate composed of a metal porous body having three-dimensionally continuous pores, a slurry mainly composed of active material powder to fill said pores of said substrate, a vessel for containing said slurry and a filing roller being at least partially dipped but not completely submerged in said slurry contained in said vessel;

continuously supplying said substrate onto said filling roller at a contact point above the surface level of the slurry; and

rotating said filling roller in such a manner that the speed of outer peripheral surface of said filling roller facing said substrate is faster than the travel speed of said substrate to fill said pores of said substrate with said slurry.

4,887,350

HANDLING APPARATUS AND METHODS

Robert T. Hopwood, Cheltenham, United Kingdom, assignor to DRG (UK) Limited, Bristol, England

PCT No. PCT/GB88/00026, § 371 Date Aug. 16, 1988, § 102(e) Date Aug. 16, 1988, PCT Pub. No. WO88/05608, PCT Pub. Date Jul. 28, 1988

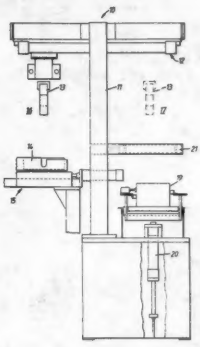
PCT Filed Jan. 15, 1988, Ser. No. 235,871

Claims priority, application United Kingdom, Jan. 16, 1987, 8700906

Int. Cl.[4] B23P *19/00*; B25B *1/04*

U.S. Cl. 29—730 23 Claims

1. A method of handling battery plate groups or the like, comprising mechanically gripping a set of groups whilst they are retained in a predetermined alignment, releasing the set of groups from that retainment, transporting the set of groups in the mechanically gripped state to a multi-compartment holder, loading respective groups from the set into a first set of non-adjacent compartments in the holder and then releasing them



and loading further respective groups into a second set of non-adjacent compartment and then releasing them.

4,887,351

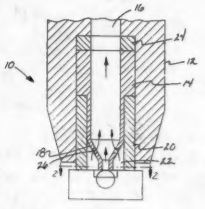
PICK AND PLACE NOZZLE WITH CONCENTRIC GROOVES

Richard F. Porterfield, Binghamton, N.Y., and Douglas A. Biesecker, Clarks Summit, Pa., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Sep. 9, 1988, Ser. No. 242,428

Int. Cl.[4] B25J *15/06*; H05K *13/04*

U.S. Cl. 29—740 7 Claims



1. A pick and place device for efficiently picking up electronic components of widely varying sizes and shapes and placing the components as desired on a substrate, said device comprising:

a spindle, said spindle includes a nozzle body surrounding a concentric inner sleeve, said inner sleeve having a substantially funnel-shaped nozzle tip disposed at its lower end and said spindle further includes a central vacuum channel formed in said inner sleeve;

a first vacuum means coupled to said spindle for creating a first vacuum pressure;

a second vacuum means coupled to said spindle for creating a second vacuum pressure greater than said first vacuum pressure, said first vacuum means facilitating pick-up of smaller electronic components and said second vacuum means facilitating pick-up of larger electronic components;

wherein said first vacuum means generates a first vacuum area A1 and said second vacuum means generates a second vacuum area A2, said second vacuum area A2 being substantially concentric to said first vacuum area A1; and

an outer cushion disposed between the lower end portion of said nozzle body and said nozzle tip, said outer cushion forming a chamber between said outer cushion and said

nozzle tip, said chamber corresponding to said vacuum area A2 and the inner diameter of said nozzle tip corresponding to said vacuum area A1.

4,887,352

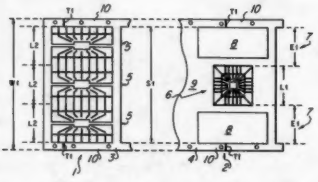
METHOD FOR MAKING MATRIX LEAD FRAME

Anthony L. Adams, Wylie, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 947,945, Dec. 31, 1986, abandoned. This application Apr. 15, 1988, Ser. No. 183,543

Int. Cl.[4] H01R *43/00*

U.S. Cl. 29—827 **7 Claims**



1. A method for standardizing the width of a lead frame matrix, wherein the lead frame matrix is an array of a plurality of lead frames of a single size and shape selected from a group of possible sizes and shapes, comprising the steps of:

providing one or more spacing elements along the width of said lead frame matrix, sufficiently wide to contribute to the width of said lead frame matrix so that said lead frame matrix is of said standard width;

calculating the width of said spacing elements by:

(a) adding the widths of two matrix guide bars of said lead frame matrix to get a partial sum;

(b) adding to said partial sum the widths of as many lead frames as are along the width of said lead frame matrix to update said partial sum; and

(c) subtracting said updated partial sum from said standard width to be taken up by spacing elements.

4,887,353

CONDUCTION COOLED MODULE CONNECTOR SYSTEM AND METHOD OF MAKING

George Preputnick, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 1, 1985, Ser. No. 729,432

Int. Cl.[4] H05K *3/36*; H01R *23/70*

U.S. Cl. 29—830 **6 Claims**

1. A method of forming connector assemblies and connecting them to a printed circuit board, comprising the steps of:

a. electrically connecting electrical contacts of first and second electrical connectors to respective conductive traces on first and second daughter cards thereby forming subassemblies;

b. testing the subassemblies to determine if electrical contacts or daughter cards should be replaced;

c. securing the first and second connectors together with a heat sink member disposed between the daughter cards; and

d. electrically connecting the first and second electrical connectors with a third electrical connector electrically connected to the printed circuit board.

3. An electrical connection assembly connecting daughter cards to a printed circuit board, comprising:

a. first and second electrical connectors having electrical contact members secured therein, said electrical contact members having first contact sections electrically connected to conductive traces on the daughter cards and second contact sections;

b. securing means provided by said first and second electrical connectors and the daughter cards securing said first and second electrical connectors and the daughter cards together, said securing means on said first and second electrical connectors engaging each other thereby spacing the daughter cards from each other and providing a space therebetween;

c. heat sink means disposed in said space between the daughter cards and secured therein by said securing means; and

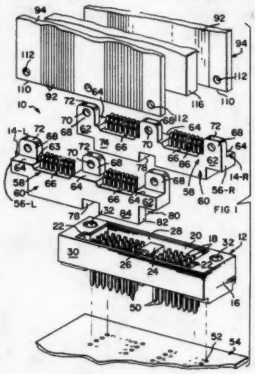


FIG 1

d. a third connector electrically connected to the printed circuit board and having electrical contact means that electrically connect with the second contact sections of said first and second electrical connectors when they mate with said third connector.

4,887,354

METHOD OF MANUFACTURING AN ELONGATE ARTICLE

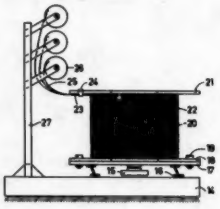
Johan Van Der Maaden, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 22, 1982, Ser. No. 443,493

Claims priority, application Netherlands, Apr. 8, 1982, 8201501; Sep. 1, 1982, 8203412

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—868 **23 Claims**



1. A method of manufacturing an elongate article comprising one or more elongate elements disposed within respective channels extending in the longitudinal direction of an elongate carrier member, cross section dimensions of each channel being larger than corresponding cross section dimensions of the respective element disposed within said channel, characterized by the steps of:

inserting at least one elongate element a small distance into the end of a channel, and then

subjecting at least a part of the carrier member to a periodic movement,

returning the carrier member to its initial position periodically, and

selecting the magnitude and acceleration of said periodic movement and return such that the elongate element is moved in the longitudinal direction of the channel into the channel as a result of the mass inertia of the element.

4,887,355

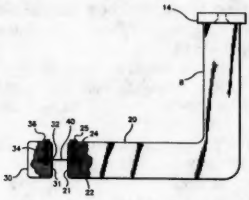
SNACK PACK OPENER

Brian S. Colbert, 1055 Palm Ave., Carlsbad, Calif. 92008

Filed Jun. 6, 1988, Ser. No. 202,478

Int. Cl.[4] B26B *3/00*

U.S. Cl. 30—2 **5 Claims**



1. A snack pack opener comprising:

a support bracket assembly having means for securing it to the bottom surface of a cabinet or shelf;

a safety guard assembly;

an elongated razor blade having a first end and a second end;

said support bracket assembly and said safety guard assembly each having a vertical wall surface and these wall surfaces are spaced a predetermined distance apart;

means for detachably connecting the first end of said razor blade to the vertical wall surface of said support bracket assembly so that said razor blade extends therefrom in a cantilevered position; and

means for detachably connecting the second end of said razor blade to the vertical wall surface of said safety guard assembly so that said safety guard assembly is entirely supported by said razor blade.

4,887,356

HAIR SCULPTURING RAZOR

M. David Rudd, Sr., Paducah, Ky., assignor to W. Ralph Bean, Paducah, Ky., a part interest

Filed Mar. 2, 1988, Ser. No. 163,089

Int. Cl.[4] B26B *21/08*

U.S. Cl. 30—30 **4 Claims**

1. Razors for cutting and or sculpturing of hair wherein the improvement comprises providing as the continuous ground cutting edge of said razors a cutting edge having a series of uniformly spaced dulled segments across said cutting edge, said dulling being from 20 to 75 percent of the normal cutting edge of said razor, only the ground cutting edge being so dulled, there being no cutting co-action of other hair gathering interaction between said razor edge and the balance of said razor.

4,887,357

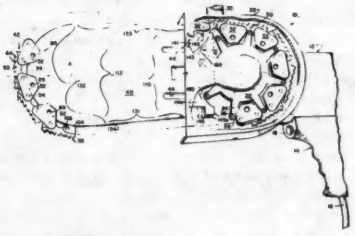
ARTICULATED ENDLESS-BAND SAW BLADE AND SUPPORT THEREFOR

Carl J. Alexander, Three Rivers, Mich., assignor to Pro Power Corporation, Kalamazoo, Mich.

Continuation of Ser. No. 934,397, Nov. 24, 1986, abandoned. This application Jul. 1, 1988, Ser. No. 214,745

Int. Cl.[4] B27B *17/02, 33/14*

U.S. Cl. 30—383 **13 Claims**



1. A saw blade, for coacting with a saw-blade support, the peripheral portion of said support defining two substantially parallel side surfaces and a transverse blade-support bearing edge extending between the two side surfaces, which saw blade comprises:

an endless band of cutting members arranged in a single row, having a pair of parallel, oppositely-facing, substantially planar sides;

each cutting member having a substantially planar top margin with cutting teeth therein;

a pair of end margins;

a bottom margin defining bearing faces for slidably abutting the bearing edge of said saw-blade support;

substantially parallel link members free of teeth and arranged in two substantially parallel spaced-apart rows;

means pivotally connecting said cutting members to said link members to form said endless band with extended portions of said link members extending beyond the bearing faces of said cutting member and being disposed along both side faces of said saw-blade support when two adjacent cutting members are oriented to lie on said saw-blade support with their top margins in a generally straight line, thereby forming retaining means for retaining said saw blade on said saw-blade support;

each said cutting member having a reduced thickness portion at each end margin below said cutting teeth for defining a recess extending to said bottom and side margins in each planar side thereof; and

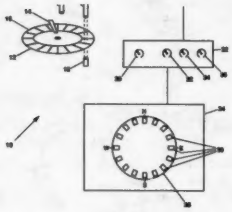
a portion of each said link member being received in a recess provided in one cutting member and another portion thereof being received in a recess provided in an adjacent cutting member to form said endless band having the outer surfaces of said link members flush with the outer surfaces of said cutting members.

4,887,358

ELECTRONIC COMPASS

Insik Kang, 16945 Blackhawk St. #12, Granada Hills, Calif. 91344

Filed Apr. 20, 1988, Ser. No. 183,996
Int. Cl.[4] G01C *17/26*
U.S. Cl. 33—363 K 7 Claims



3. An electronic compass comprising:

(a) a wheel formed of transparent material and mounted for rotation in a horizontal plane,

(b) a gray scale having a plurality of shades and carried by said wheel,

(c) a magnet carried by said wheel to cause said wheel to seek magnetic north,

(d) a light source mounted adjacent one surface of said wheel,

(e) photoresponsive means mounted adjacent a surface of said wheel opposite said light source to generate an electrical signal indicative of the intensity of light from said source passing through said gray scale,

(f) voltage comparator means connected to receive the signals from said photoresponsive means and to compare said signals to a known voltage to derive a signal indicative of the rotational position of said wheel, and

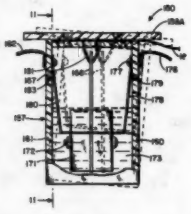
(g) a compass rose having sixteen light emitting diodes corresponding with the sixteen gray scale shades where said light emitting diodes are positioned about said compass rose at locations corresponding to respective compass points, said light emitting diodes being activated by appropriate signals from said voltage comparator providing a visual indication of the orientation of said wheel with respect to magnetic north.

4,887,359

VEHICLE LEVELING AND STABILIZING APPARATUS

Walter E. Hofius, 4030 W. 118th St., Bloomington, Minn. 53437

Division of Ser. No. 12,327, Feb. 9, 1987, Pat. No. 4,784,400. This application Jul. 18, 1988, Ser. No. 227,003
Int. Cl.[4] G01C *9/06;* B60Q *1/52*
U.S. Cl. 33—366 17 Claims



1. A level sensing apparatus comprising:

a housing having upper support means;

an electrically conductive pendulum comprised as a flat plate-like member with planar surfaces

pivot means connected to the upper support means pivotally suspending the pendulum in the housing permitting back and forth movement relative to the housing in an arcuate path about a fixed axis that is parallel to the planar surfaces of the pendulum;

a first resilient electrical contact attached at a first end to the housing and having a second end located proximate the pendulum and in the arcuate path of movement of the pendulum;

a first electrical lead extending from the first electrical contact;

a second resilient electrical contact attached at a first end to the housing and having a second end located proximate the pendulum in the arcuate path of and on the side of the pendulum opposite the first contact;

a second electrical lead extending from the second contact;

a third electrical lead extending from the pendulum;

means for introduction of electricity through the third electrical lead;

a first electrically actuated indicating device located in a first electrical circuit including the pendulum, the third electrical lead, the first electrical lead and the first contact;

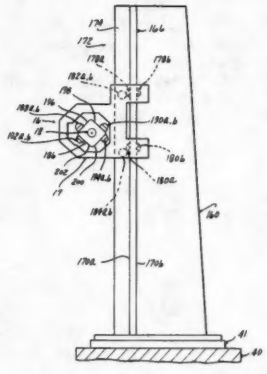
a second electrically actuated indicating device located in a second electrical circuit including the pendulum, the third electrical lead, the second electrical lead and the second electrical contact whereby upon inclination of the housing in a direction to swing the pendulum, it makes a circuit with one of the electrical indicating devices to the exclusion of the other to indicate a direction of off level.

4,887,360

WAY BEARING ARRANGEMENT FOR A HORIZONTAL ARM COORDINATE MEASURING MACHINE

Thomas L. Hemmelgarn, Dayton, and Freddie L. Raleigh, Centerville, both of Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 305,598, Feb. 3, 1989. This application May 30, 1989, Ser. No. 359,062
Int. Cl.[4] G01B *7/03*
U.S. Cl. 33—503 12 Claims



1. In combination with a coordinate measuring machine (10) of the type including a base (12) having way surfaces (32, 34, 36, 38, 72, 74) extending along a horizontal axis including a first pair of horizontal parallel spaced apart way surfaces (32, 34), an X-carriage (40), X-carriage bearing means supporting and guiding said X-carriage (40) for movement along said ways (32–38), and comprising a plurality of X-carriage support bear-

ings (46*a,b*; 48*a,b*; 66*a,b*; 64*a,b*; 76*a,b*; 78*a,b*) mounted on said X carriage (40);

a vertical column assembly (14) including a column member (160) attached to said X-carriage (40) extending vertically up therefrom to move along said X-axis therewith;

a probe assembly (16) including a probe tip (18) for contacting workpieces, and an elongated probe shaft (186) extending horizontally from said column assembly (14) orthogonally to said X-axis; way surfaces (196–202) formed along the length of said probe shaft (186) extending along a horizontal Z-axis; probe bearing means supporting and guiding said probe shaft (186) for movement along said probe shaft way surfaces (196–202) comprising a plurality of probe support bearings (188*a,b*; 190*a,b*; 192*a,b*; 194*a,b*) mounted on said YZ carriage;

said column member (160) having way surfaces (168*a,b*; 170*a,b*; 174*a,b*) extending along a vertical Y-axis; a YZ carriage (17); YZ carriage bearing means supporting and guiding said YZ carriage (17) for movement along said column member way surface (168 *a,b*; 170*a,b*; 174*a,b*) comprising a plurality of YZ carriage support bearings (204*a,b*; 180*a,b*; 184*a,b*; 182*a,b*; 178*a,b*) mounted on said YZ carriage (17);

a workpiece support table (20) located on one side of said X-axis way surfaces (32–38) defining the front of said machine (10) with the tip (18) of said probe assembly (16) extending to the front of said machine (10);

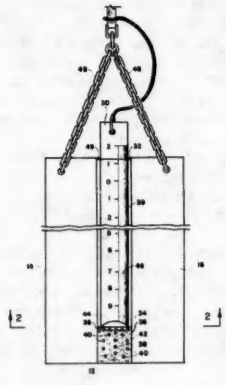
characterized by said X carriage support bearings including a spaced apart front located pair of air bearings (48*a,b*) riding on one of said horizontal parallel way surfaces (34) located on the front side of said X-axis and a relatively closely spaced rear pair of air bearings (46*a,b*) located on the rear side of said X-axis and spaced apart a distance less than the spacing of said front pair.

4,887,361

STREAMLINED FREEBOARD MEASURING DEVICE

Philip A. Latham, 226 Walter Rd., River Ridge, La. 70123

Filed Sep. 13, 1988, Ser. No. 243,686
Int. Cl.[4] G01B *3/02*
U.S. Cl. 33—720 **30 Claims**



1. A freeboard measuring device, comprising:

a substantially narrow, flat elongated housing having means for water ingress;

a means for freeboard measurement mounted, at least in part, within the said elongated housing; and

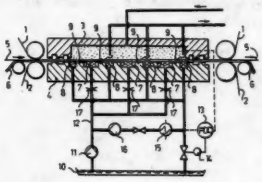
a fin means securedly attached to said elongated housing for streamlining said device in water without increasing its resistance to a water flow acting on a side of the housing.

4,887,362

METHOD AND AN APPARATUS FOR DRYING A PAPER WEB OR THE LIKE

Paavo Rautakorpi, Tampere, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed Jan. 22, 1988, Ser. No. 147,136
Claims priority, application Finland, Feb. 5, 1987, 870483
Int. Cl.[4] F26B *3/32*
U.S. Cl. 34—41 **13 Claims**



1. A method for drying a paper web comprising the steps of:

(a) transferring the web on a drying surface between a pair of endless bands so that one of said pair of endless bands engages the paper web to be dried, and the other of said pair of endless bands engages the drying surface;

(b) heating said one band by means of steam in a steam chamber partially defined by said one band;

(c) simultaneously cooling said other band in an area below said steam chamber by hydrostatic plate means provided with a plurality of pressure pockets and return conduits separated by ridge means which provide support for said other band, wherein, during the practice of step (c), water is fed into the pressure pockets and passes between the ridge means and said other band into said return conduits; and

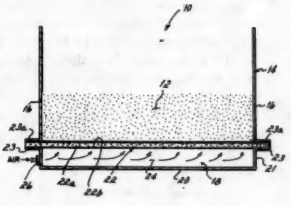
(d) adjusting pressure in said return conduits as a function of steam pressure in the steam chamber.

4,887,363

FLUIDIZED BED HOPPER

Richard D. Burke, Amherst, Ohio, assignor to Nordson Corporation, Westlake, Ohio

Filed Jul. 8, 1987, Ser. No. 70,972
Int. Cl.[4] F26B *17/00*
U.S. Cl. 34—57 A **17 Claims**



1. A fluidizing bed hopper for fluidizing very fine particle powders of from approximately 1 to 10 microns in diameter comprising

a container having side walls,

an air plenum in the bottom of said container,

said air plenum having air impervious side walls, an air impervious bottom wall, and an air pervious top wall spaced above said bottom wall,

means for admitting air under pressure greater than atmospheric pressure to the interior of said air plenum, and

the improvement wherein said air pervious top walls comprises

(a) a rigid porous plate, and

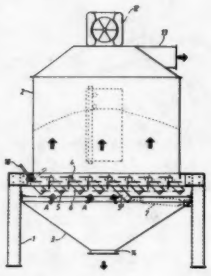
(b) a non-woven fiber filter media overlying said rigid porous plate.

4,887,364

DEVICE FOR COOLING AND/OR DRYING BULK GOODS

Pierre M. L. Geelen, Haelen, Netherlands, assignor to Geelen Techniek B.V., Haelen, Netherlands

Filed May 27, 1988, Ser. No. 199,909
Claims priority, application Netherlands, Jun. 5, 1987, 8701318; Nov. 23, 1987, 8702798
Int. Cl.[4] F26B *17/00*
U.S. Cl. 34—57 C 7 Claims



1. A device for cooling and/or drying bulk goods, which comprises:

a bunker having a supply opening for material to be cooled, said supply opening being located near an upper side of the bunker;

a single grate construction located near a bottom side of the bunker, said grate construction including a plurality of bar-shaped means extending at least substantially parallel to each other;

means for supplying cooling and/or drying air to an interior portion of the bunker through the grate construction at the bottom side of the bunker and for discharging said air near the upper side of the bunker after said air has flowed through the material;

means for pivoting the bar-shaped means forwards and backwards about a centre position during operation, wherein the bar-shaped means comprise plate-shaped parts extending along both sides of longitudinal axes of said bar-shaped means, said plate-shaped parts being arranged so as to overlap each other during normal operation, and means for adjusting the centre position of the bar-shaped means and wherein the bar-shaped means with the plate-shaped means fixed thereto is pivotable forwards and backwards in any of a plurality of predetermined centre positions.

4,887,365

APPARATUS FOR CONTINUOUSLY DRYING COATING LAYER ON WEB

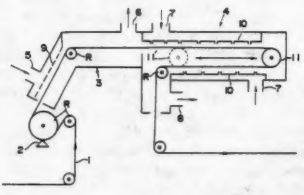
Kazutaka Oda, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 7, 1988, Ser. No. 267,883
Claims priority, application Japan, Nov. 6, 1987, 62-279343
Int. Cl.[4] F26B *19/00*
U.S. Cl. 34—60 12 Claims

1. An apparatus for continuously drying a coating layer on a web, comprising:

a drying chamber;

a deflecting and heating roller for deflecting the web which has the coating layer and which travels continuously in said drying chamber, said deflecting and heating roller being variable in position for deflecting the web so that a length of the web to reside in said drying chamber is capable of being variably adjusted; and



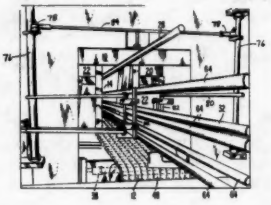
gas-flow supply means for supplying gas flow to the coating of the web traveling in said drying chamber.

4,887,366

ARTICLE DRYING APPARATUS WITH ADJUSTABLE DRYING PLENUM MEANS

Henry Y. Kuhl, Kuhl Rd., P.O. Box 26, Flemington, N.J. 08822-0026

Filed Jun. 16, 1988, Ser. No. 207,420
Int. Cl.[4] F26B *19/00*
U.S. Cl. 34—229 18 Claims



18. An article drying apparatus with adjustable drying plenum means comprising:

(a) a housing means defining a drying chamber therein being adapted to receive an article for drying thereof;

(b) a conveying means positioned extending generally horizontally through said housing means and movable with respect thereto through said drying chamber to selectively transport articles for drying therethrough;

(c) a blower means adapted to supply air to said drying chamber of said housing means;

(d) a drying plenum means comprising:

(1) a first drying plenum positioned laterally adjacent said drying chamber and comprising:

a. a first plenum box movably mounted with respect to said housing means adjacent said drying chamber defined therein, said first plenum box defining a first air inlet to receive air supplied thereto from said blower means and defining a first air outlet for guiding air therefrom into said drying chamber onto articles positioned therein for drying thereof;

b. a first air distribution control attached with respect to said first plenum box adjacent said first air outlet defined therein to guide air exiting from said first plenum box through said first air outlet onto articles located within said drying chamber, said first air distribution control means defining a first air slot therein oriented obliquely with respect to the direction of conveyor movement;

c. a first conduit means in fluid flow communication between said blower means and said first air inlet of said

first plenum box to guide air from said blower means to said first air inlet of said first plenum box, said first conduit means being flexible to facilitate movable positioning of said first drying plenum with respect to said housing;

(2) a second drying plenum positioned laterally adjacent said drying chamber oppositely from said first drying plenum, said second drying plenum including:

a. a second plenum box movably mounted with respect to said housing means adjacent said drying chamber defined therein, said second plenum box defining a second air inlet to receive air supplied thereto from said blower means and defining a second air inlet to receive air supplied thereto from said blower means and defining a second air outlet for guiding air therefrom into said drying chamber onto articles positioned therein for drying thereof;

b. a second air distribution control attached with respect to said second plenum box adjacent said second air outlet defined therein to guide air exiting from said second plenum box through said second air outlet onto articles located within said drying chamber, said second air distribution control means defining a second air slot therein oriented obliquely with respect to the direction of conveyor movement;

c. a second conduit means in fluid flow communication between said blower means and said second air inlet of said second plenum box to guide air from said blower means to said second air inlet of said second plenum box, said second conduit means being flexible to facilitate movable positioning of said second drying plenum with respect to said housing;

(3) a third drying plenum positioned adjacent said drying chamber and above said conveying means, said third drying plenum comprising:

a. a third plenum box movably mounted with respect to said housing means adjacent said drying chamber defined therein, said third plenum box defining a third air inlet to receive air supplied thereto from said blower means and defining a third air outlet for guiding air therefrom into said drying chamber onto articles positioned therein for drying thereof;

b. a third air distribution control attached with respect to said third plenum box adjacent said third air outlet defined therein to guide air exiting from said third plenum box through said third air outlet onto articles located within said drying chamber, said third air distribution control means defining a third air slot therein oriented obliquely with respect to the direction of conveyor movement;

c. a third conduit means in fluid flow communication between said blower means and said third air inlet of said third plenum box to guide air from said blower means to said third air inlet of said third plenum box, said third conduit means being flexible to facilitate movable positioning of said third drying plenum with respect to said housing;

(4) a fourth drying plenum positioned adjacent said drying chamber and below said conveying means, said fourth drying plenum comprising:

a. a fourth plenum box movably mounted with respect to said housing means adjacent said drying chamber defined therein, said fourth plenum box defining a fourth air inlet to receive air supplied thereto from said blower means and defining a fourth air outlet for guiding air therefrom into said drying chamber onto articles positioned therein for drying thereof;

b. a fourth air distribution control attached with respect to said fourth plenum box adjacent said fourth air outlet defined therein to guide air exiting from said fourth plenum box through said fourth air outlet onto articles located within said drying chamber, said fourth air distribution control means defining a fourth air slot therein oriented obliquely with respect to the direction of conveyor movement;

c. a fourth conduit means in fluid flow communication between said blower means and said fourth air inlet of said fourth plenum box to guide air from said blower means to said fourth air inlet of said fourth plenum box, said fourth conduit means being flexible to facilitate movable positioning of said first drying plenum with respect to said housing;

e) article retaining means positioned within said drying chamber above said conveying means to retain articles thereupon, said article retaining means including laterally movable members adapted to retain articles being transported upon said conveying means;

f) plenum adjustment means operatively secured with respect to said drying plenum means for controlling adjustable positioning thereof with respect to said housing means, said plenum adjustment means including pneumatic cylinder means adapted to relocate said drying plenum means as desired in spaced relation with respect to articles positioned within said drying chamber upon said conveying means; and

g) adjustably positionable stop means selectively fixedly securable with respect to said housing to facilitate selective positioning of each of said drying plenum means with respect thereto.

4,887,367

SHOCK ABSORBING SHOE SOLE AND SHOE INCORPORATING THE SAME

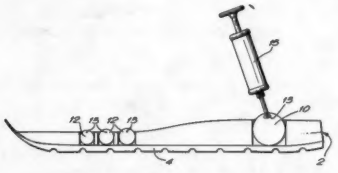
Terry Mackness, and Frank V. Wezel, both of Southend-on-Sea, England, assignors to Hi-Tec Sports PLC, Essex, England

Filed Jul. 11, 1988, Ser. No. 217,188

Claims priority, application United Kingdom, Jul. 9, 1987, 8716200; May 31, 1988, 8812867

Int. Cl.[4] A43B *13/18*

U.S. Cl. 36—28 **17 Claims**



14. A sports shoe or casual shoe comprising an upper, a sole, and a removable insole, said sole comprising a wear-resistant outsole layer, at least one midsole layer, and a heel wedge, a first recess being formed in said heel wedge and midsole layer at a first location corresponding to the heel of a wearer's foot, a plurality of second recesses being formed in said midsole layer at a plurality of second locations corresponding to the metatarsal region of a wearer's foot, said recesses being bounded on the underside by the outsole layer and above by the removable insole, a first resilient body of selectable hardness characteristics removably received in said first recess, the first resilient body comprising a gas-filled body and valve means for selectively inflating and deflating said body, and a plurality of second resilient bodies of selectable hardness characteristics removably received in said plurality of second recesses.

4,887,368

MEANS FOR STORING AND DISTRIBUTING HEAT AND USE THEREOF

Arno Walter Latzke, Zelg-Wolfhalden, Fed. Rep. of Germany, assignor to Indentor AG, Wolfhalden, Fed. Rep. of Germany

Continuation of Ser. No. 157,062, Feb. 2, 1988, abandoned, which is a continuation of Ser. No. 16,500, Feb. 17, 1987, abandoned, which is a continuation of Ser. No. 738,913, May 29, 1985, abandoned. This application Sep. 1, 1988, Ser. No. 239,410

Claims priority, application Fed. Rep. of Germany, May 30, 1984, 3420121; Jun. 20, 1984, 3422783; Aug. 27, 1984, 3431474; Oct. 30, 1984, 3439727; European Pat. Off., Mar. 27, 1985, 85 103619.4; Apr. 25, 1985, 85 105047.6

Int. Cl.[4] A43B *13/38*

U.S. Cl. 36—44 6 Claims

1. A device for storing and distributing heat on areas of the outer surfaces of human skin, comprising:

a pair of closed porous polyethylene foam layers, each having a thickness of from 0.8 to 8 mm;

a flexible heat conductive metal layer interposed between said foam layers and having a thickness of 0.02 to 0.08 mm, said metal layer being made of a material selected from the group consisting of aluminum and copper;

a skin compatible layer of textile fabric laminated to an entire outer surface of one of said foam layers wherein said skin compatible layer is the top-most layer such that said skin compatible layer comes into direct contact with the skin of the user; and

means for attaching the device to the skin;

wherein said foam layers are laminated to adhere firmly together;

wherein said skin compatible layer is impregnated with a substance which promotes blood circulation when this substance comes into contact with the skin of the user.

4,887,369

CHANGEABLE SHOE TOPS/HEELS

Angileen Bailey, 6701 Stearns, Houston, Tex. 77021, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007

Filed Aug. 12, 1988, Ser. No. 231,686

Int. Cl.[4] A43B *3/24*

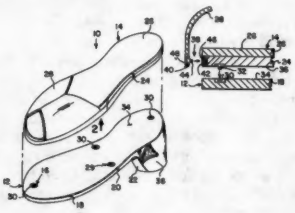
U.S. Cl. 36—101 3 Claims

1. A convertible shoe which comprises:

(a) a shoe bottom having a forward outsole portion, a middle shank, a raised heel, and an upper surface;

(b) a shoe top having a midsole with top, bottom, and side surfaces, an insole, and an upper vamp portion with bottom ends;

(c) means for removably attaching said shoe top to said shoe bottom wherein said means includes a plurality of snap fasteners having female socket segments and male stud segments, said female socket segments are spaced apart on said upper surface while said male stud segments are spaced apart on said bottom surface of said midsole, so that said male stud segments will communicate with said female socket segments, further comprising means for removably attaching said upper vamp portion to said midsole wherein the second said means includes a plurality of snap fasteners having female socket segments and



male stud segments, said female socket segments are spaced apart on said midsole while said male stud segments are spaced apart on said bottom ends of said upper vamp portion so that said male stud segments will communicate with said female socket segments.

4,887,370

SKI BOOT MADE OF HARD SYNTHETIC RESIN

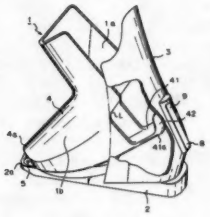
Takashi Okada, Shizuoka, Japan, assignor to Yamaha Corp., Japan

Filed Jun. 29, 1988, Ser. No. 212,949

Claims priority, application Japan, Jun. 29, 1987, 62-162172

Int. Cl.[4] A43B *5/04*

U.S. Cl. 36—120 9 Claims



1. A ski boot made of a hard synthetic resin, said boot comprising:

a sole;

a front shell;

a rear shell, at least a part of said rear shell being formed integrally with said sole in such a manner that said rear shell cannot be rotated in a direction away from said front shell; and

said front shell being separate from said rear shell and being pivoted at its front end to the front end of said sole so as to be rotatable in the longitudinal direction of said sole toward and away from said rear shell.

4,887,371

DREDGES

Johann F. Kaiser, 6 Tweed Street, Bilambil Heights NSW 2485, Australia

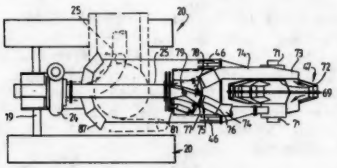
Filed Jul. 26, 1988, Ser. No. 224,295

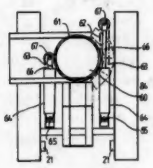
Int. Cl.[4] E02F *3/92*

U.S. Cl. 37—66 13 Claims

1. A submersible dredge assembly comprising a mobile carriage adapted to be located on the bed of a river, sea, bay or other submerged surface, drive means associated with said carriage and operable to move said carriage about said bed, a

rotatable turntable on said carriage, dredging means supported on said turntable, said dredging means being adapted to engage said bed and displace material therefrom, means for conveying said displaced material to a remote location, first sprocket





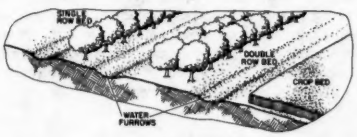
means mounted for rotation with said turntable, a chain engaged with said first sprocket means, and actuator means for moving said chain whereby to cause rotation of said first sprocket means and said turntable.

4,887,372

SHALLOW ANGLE FURROW REFURBISHING METHOD AND APPARATUS

Donald P. Block, Clermont, Fla., assignor to Orange Service Company, Inc., Orlando, Fla.

Filed Aug. 9, 1988, Ser. No. 230,027
Int. Cl.[4] E02F 5/08
U.S. Cl. 37—91 17 Claims



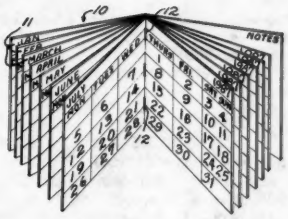
1. A method for refurbishing shallow angle furrows formed in the spacing between adjacent beds of agricultural crops, the furrows having oppositely sloped side walls of angle 30° or less from horizontal, and having furrow wall edges, the method comprising, in a single pass of travel longitudinally of the furrow, simultaneously shaping both walls by cutting them laterally, parallel to the wall slopes by means of cutter blades mounted on drums and rotated about generally vertical axes, oriented perpendicular to the furrow walls, using planar cutting motions of the blades along paths parallel to the walls of the furrows; the cutter blades cutting into the ground laterally and, simultaneously therewith and following continuously thereupon, lifting the material thus cut from the walls and delivering the same upwardly and outwardly beyond the furrow wall edges and onto the beds.

4,887,373

CALENDAR/EXECUTIVE PLANNER WITH REPOSITIONAL PERSONAL DIRECTORY SECTION

Norman Macaulay, 66 Millwood Dr., Tonawanda, Erie, N.Y. 14150

Continuation of Ser. No. 86,787, Aug. 19, 1987, abandoned. This application Sep. 6, 1988, Ser. No. 243,113
Int. Cl.[4] B42D 1/10; B42F 1/00, 5/00
U.S. Cl. 40—119 5 Claims



1. A calendar and notational information booklet system for conveying notational information from one of such calendar and notational booklets to at least one of a succession of such calendar and notational booklets, said system comprising:

a booklet having a plurality of bound leaves pre-printed with calendar indicia and at least one other leaf;

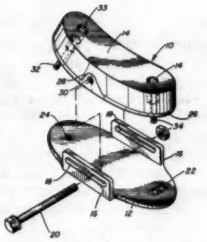
at least one notational information sheet having indicia on one side thereof for accepting notational information and having repositionable adhesive on the other side, said at least one notational information sheet mountable on said at least one other leaf of said booklet for accepting and retaining notational information thereon and removeable therefrom for transfer to the at least one other leaf of at least one of a succession of said booklets.

4,887,374

RECOIL PAD FOR RIFLE

Mario Santarossa, 3041 Parkwood Avenue, Windsor, Ontario, Canada (N8W 2K5)

Filed Feb. 10, 1989, Ser. No. 308,531
Int. Cl.[4] F41C 23/00
U.S. Cl. 42—73 3 Claims



1. A gun butt for attachment to the stock of a firearm, said butt comprising:

a generally flat plate member for securement to said stock;

a recoil pad having a combined base portion and pad portion thereon;

means adjustably securing said base portion to said plate member adjacent the transverse center thereof, said adjustable securing means comprising a pair of elongated, upstanding flange means, one on either side of said plate member, an elongated slot in each of said flange means,

and a tie bolt extending transverse of said plate member and through said flange slots, said base portion being pivotally mounted on said tie bolt;

said base portion having the configuration of an extremely wide "V" from its transverse center toward its ends whereby said base portion is capable of a rocking movement on the surface of the plate member about said adjustable securing means;

means on said base portion for maintaining the ends thereof at a desired distance from the surface of said plate member;

said adjustable securing means providing longitudinal movement of said base portion along the longitudinal axis of said plate member; and

means for pivotally adjusting said plate member to said firearm stock.

4,887,375

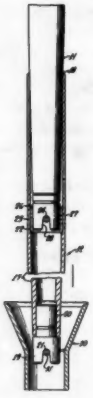
ROD EXTENSION AND METHOD OF USING THE EXTENSION IN DEEP-SEA FISHING

William D. Shedd, Mission Viejo, and Gregory S. Stotesbury, Corona Del Mar, both of Calif., assignors to Aftco Mfg. Co., Inc., Irvine, Calif.

Filed Feb. 24, 1989, Ser. No. 314,943

Int. Cl.[4] A01K *97/10*

U.S. Cl. 43—21.2 **15 Claims**



1. A deep-sea fishing rod combination, which comprises:

(a) a deep-sea fishing rod having an elongate butt,

(b) an elongate extension socket for said butt,

said extension socket being a hollow tube one end of which is open and the other end of which is not connected to any support,

said tube having the bottom end portion of said butt removably telescoped into it a substantial predetermined distance through said one end,

said extension socket being so related to said butt that said butt is a relatively snug fit in said extension socket when telescoped said predetermined distance therein,

(c) seat means provided in said hollow tube and seating said bottom end portion of said butt,

thereby limiting the amount of telescoping of said butt into said one end of said tube, despite axial thrust forces tending to increase said amount of telescoping, said seat means being such as to determine said predetermined telescoped distance and to limit said predetermined telescoped distance to an amount greatly less than the full length of said hollow tube,

whereby the combination butt and extension socket has a length greatly longer than the length of said butt, when said butt is telescoped said predetermined distance into said extension socket, and

(d) means at the bottom end of said extension socket to removably mount said extension socket on a rod support.

4,887,376

ARTIFICIAL LURE WITH TIME RELEASE ATTRACTANT

Kenneth R. Sibley, 2408 Benton St., Akron, Ohio 44312, and Gregory S. Bambeck, Box 7541, Canton, Ohio 44705

Continuation of Ser. No. 46,924, May 7, 1987, abandoned. This application Jul. 5, 1988, Ser. No. 214,855

Int. Cl.[4] A01K *85/00; A23L 1/325*

U.S. Cl. 43—42.06 **9 Claims**

1. An artificial lure of a shaped polymer containing an attractant that will distribute preferentially in water from said polymer to give an effective time release of the attractant, said polymer being a crosslinked acrylic, said cross-linked acrylic being selected from the class of acrylamide and methacrylamides with a cross linker selected from the class consisting of N-N-methylene-bis-acrylamides or methacrylamide, N,N-dihydroxy ethylene bis acrylamide or methacrylamide, bis acrylcyl cystamine, and acrylaide, and the ratio of acrylamide or methacrylamide to said cross-linker being 300:1 to 1500:1.

4,887,377

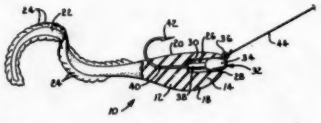
SHAD TYPE FISH BAIT WITH NOSE CAVITY

John L. Morris, Springfield, Mo., assignor to Bass Pro Shops, Inc., Mo.

Filed May 26, 1988, Ser. No. 199,094

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.24 **4 Claims**



1. An artificial fish bait comprising:

a soft plastic lure body having a nose on one end and a tail on the other end, said nose having a substantially cylindrical cavity extending therein with said cavity being open at the nose; and

a weighted jig head formed separately from the lure body and having an eye and a hook projecting therefrom, said jig head having a curved outer surface and fitting closely in said cavity with the hook extending through the lure body and the eye projecting out of the cavity to receive a fishing line on which the bait is tied.

4,887,378

FISHING LURE

Larry A. Sheehan, Springfield, and John R. James, Cassville, both of Mo., assignors to Bo-James Co., Inc., Cassville, Mo.

Filed Apr. 7, 1988, Ser. No. 178,558

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.25 **4 Claims**

1. A fishing lure comprising a head, means for attaching the head to a fishing line, a substantially planar hook having a shank projecting rearwardly from said head and a concave butt portion at the rearward end of the shank terminating in a barb, guide means on the head engageable with the mouth of a fish when the hook is inside the mouth for rotating the lure to a set position wherein the plane of the hook is substantially perpendicular to the floor and roof of the mouth of the fish and for maintaining the lure in said set position thereby to facilitate embedment of said hook in the floor or roof of the mouth, and

camming means associated with said head engageable with the closed lips of a fish for assisting in rotation of the lure to said set position, said camming means comprising a pair of substantially flat camming surfaces located on the bottom, forward

portion of said head generally symmetric about the plane of said hook and lying in planes inclined with respect to the plane of the hook, said camming surfaces being engageable with the closed lips of a fish as the lure moves forwardly in the mouth of the fish to rotate the lure toward said set position.

4,887,379

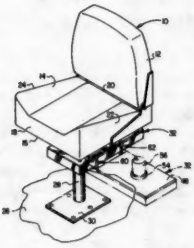
BASS BOAT PEDESTAL SEAT-MOUNTED TACKLE BOX

Dan W. Harrison, Rte. #1, Box 507, Brownsboro, Tex. 75756

Filed Mar. 1, 1988, Ser. No. 162,806

Int. Cl.[4] A01K *97/00*

U.S. Cl. 43—54.1 **6 Claims**



1. Equipment stowage apparatus for use in conjunction with an elevated seat having an underside and a peripheral side surface, comprising mounting structure for supporting an equipment storage container on the underside of the seat, the equipment storage container having spaced apart first and second portions, the second portion having oppositely facing upper and lower side surface sections and a vertical side surface section extending between the upper and lower side surface sections, said mounting structure including:

supporting means, interconnectable between the underside of the seat and the first portion of the container, for supporting the container for movement relative to the seat between a stowage position in which the container is disposed adjacent and essentially entirely beneath the underside of the seat, and a use position in which the container projects outwardly of the peripheral side surface of the seat in a manner permitting ready access thereto by a person sitting in the seat; and

latch means, securable to the seat and selectively operable by a person sitting therein, for releasably engaging and supporting the second portion of the container and cooperating with said support means to hold the container in said stowage position thereof and restrain it against appreciable movement relative to the seat,

said support means having a first end portion pivotally connectable to the underside of the seat, and a second end portion pivotally connectable to the first portion of the container, and

said latch means being mountable to the underside of the seat in a spaced apart relationship with said support means for pivotal movement relative to the search between a latching position and an unlatching position, said latch means having a latching portion which, with said latch means in said latching position and the container in its stowage position extends along, engages and restrains the upper and lower side surface sections, and the vertical side surface section, of the second portion of the container.

4,887,380

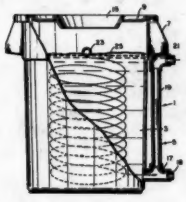
BAIT TANK

Del Andrews, 919 M Calle Amanacer, San Clemente, Calif. 92672

Continuation of Ser. No. 76,771, Jul. 27, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 297,191

Int. Cl.[4] A01K *97/04*

U.S. Cl. 43—56 **10 Claims**



10. An improved bait tank comprising a container having a substantially unobstructed interior in which bait is to be held and having a fluid inlet oriented in a first direction of sufficient size at or near the top of said container to cause liquid to be injected into the tank in sufficient volume to create a downward flow in said container, said tank having a fluid outlet at approximately the bottom of said tank, and having a fluid conduit exterior of said tank connected to said fluid outlet and extending upwardly to about said fluid inlet and being adapted for causing fluid flow from said fluid inlet downward to said fluid outlet, said fluid outlet being connected to an elongated, external pipe that extends to the height of fluid desired in the tank whereby the position of said external pipe relative to the fluid level in said bait tank causes fluid to flow from within said tank to the exterior thereof to thereby flush said bait tank, wherein the tank has a circular side wall, wherein said bait tank has a tight fitting cover with a central opening from which depends a lip for controlling splash, and interlocking means on the depending outer rim of the cover and the depending rim of the tank, wherein the interlocking means is a bolt and nut, the shaft of the bolt fits in a slot on the depending rim of the tank and locks in position when twisted, wherein the external fluid outlet means is a U-shaped construction, and wherein the bottom has reinforcing ribs and interlocking means for securing the tank to the deck or swimstep of a boat.

4,887,381

ANIMAL TRAP

James B. Tieben, Rte. 1 W. Highway 56, Dodge City, Kans. 67801

Filed Jan. 24, 1989, Ser. No. 301,184

Int. Cl.[4] A01M *23/08, 23/14*

U.S. Cl. 43—66 **26 Claims**

1. An animal trap comprising:

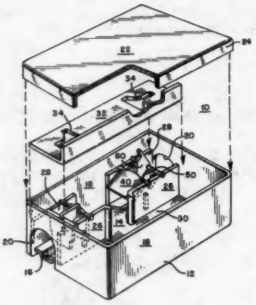
a housing comprising a bottom, a peripheral sidewall, and a top which form an imprisoning enclosure to trap an animal;

an entry port in the peripheral sidewall for providing access to the imprisoning enclosure;

an animal-actuated, gravity-lowered inner door which is hingedly mounted inwardly from the entry port for rota-

tion about a first hinge axis between an open and a closed position;

an animal-actuated, gravity-lowered outer door which is hingedly mounted between the inner door and the entry



port for rotation about a second hinge axis between an open and a closed position; and

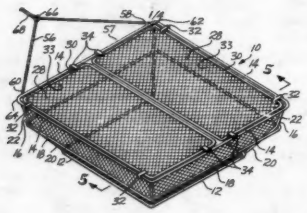
means for coupling the inner and outer doors to substantially prevent the inner door from opening in an inward direction when the outer door is in the closed position.

4,887,382

CRAB TRAP

Andrew J. Moritz, 3200 W. Commadore Way, Seattle, Wash. 98199

Filed Oct. 24, 1988, Ser. No. 261,111
Int. Cl.[4] A01K *69/08*
U.S. Cl. 43—102 **29 Claims**



1. Crab trap, comprising:

a frame composed of frame members and including a multi-sided bottom frame portion, a larger, equal-sided top frame portion spaced above the bottom frame portion, and generally diagonal frame members connecting the top frame portion to the bottom frame portion;

a door opening adjacent at least one side of the bottom frame portion;

barrier walls secured to the frame and defining an enclosure which is normally closed, said barrier walls including a bottom barrier wall and an inwardly opening flap door normally closing said door opening; and

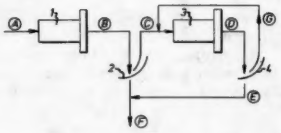
said flap door having a top connected to the trap and having a lower edge, said flap door normally being in a closed position with said lower edge contiguous the bottom barrier wall, and said flap door being resiliently bendable inwardly so that a crab seeking to enter the trap can lift the flap door and crawl into the trap below the flap door.

4,887,383

PROCESS FOR PRODUCING A SLURRY OF A PULVERIZED CARBONACEOUS MATERIAL

Mait M. Mathiesen, Arild; Lars I. Gillberg, Lund; Karl M. E. Hellsten, Ödsmal, and Gunvor B. T. Karlsson, Stenungsund, all of Sweden, assignors to AB Carbogel, Helsingborg and Berol Kemi AB, Stenungsund, both of, Sweden

Continuation of Ser. No. 905,753, Sep. 9, 1986, abandoned, which is a continuation of Ser. No. 492,194, May 6, 1983, abandoned. This application Nov. 25, 1987, Ser. No. 125,184
Claims priority, application Sweden, May 7, 1982, 8202879
Int. Cl.[4] C10L *1/32*
U.S. Cl. 44—51 **11 Claims**



1. A process for producing a slurry of a pulverized carbonaceous material having a particle size distribution with a certain average particle size and a certain maximum particle size, said process including a comminuting phase comprising at least two different milling stages, each including at least one mill, and combining the milled material with a carrier liquid to provide the slurry, characterized in

(a) that the carbonaceous material is milled in a first milling stage;

(b) that the milled product from stage (a) is divided into coarse material having an average particle size which is larger than the average particle size of the ultimate particle size distribution and into fine material having a particle size smaller than that of the coarse material;

(c) that the coarse material from stage (b) is milled in a different further milling stage to produce a further portion of fine material, the average particle size of which is smaller than the average particle size of the final slurry; and

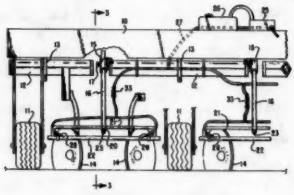
(d) that a slurry is produced of the combined portions of fine material from the different stages.

4,887,384

CONTROLLED WICK-TYPE HERBICIDE APPLICATOR

Darwin O. Reyne, R.R. 1, Box 51, Rushmore, Minn. 56168

Filed Apr. 25, 1988, Ser. No. 186,027
Int. Cl.[4] A01G *13/00*
U.S. Cl. 47—1.5 **2 Claims**



1. In combination with a row-crop field cultivator having a frame including at least two bars, earth engaging weed control means mounted on one of said bars adapted to physically control weeds between rows of a crop; herbicide applicator means comprising separate wick means adjustably mounted on the other of said bars, whereby the height of said wick means above the crop may be precisely and individually adjusted, each wick means including a support slidably mounted relative

to said other bar, a rope-like wick attached at its ends to said support, each of said wick means being adapted to be carried above a single row of crop, and supply means connected to said wick means to supply liquid herbicide to said wick means, said supply means including hollowed needles having sharpened points inserted into the interior near each end of said wick.

4,887,385

CONNECTING MEANS FOR FRANGIBLE AND/OR FRIABLE ARTICLES

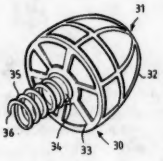
Barry D. James, and Herbert W. James, both of Sambourne, England, assignors to James Naylor Limited, Worcestershire, England

Filed Dec. 7, 1987, Ser. No. 129,654

Claims priority, application United Kingdom, Dec. 12, 1986, 8629788

Int. Cl.[4] A01G 5/00

U.S. Cl. 47—41.12 9 Claims



1. An assembly comprising

a cage having a base and an enclosure member with openings therethrough and detachably secured to said base, said base having a spigot depending therefrom,

a first floral foam member contained within said enclosure member,

a helical member having one end snugly engaging said spigot and a portion defining a helical path in a lower end remote from said base, said helical path portion being capable of insertion into a second floral foam member.

4,887,386

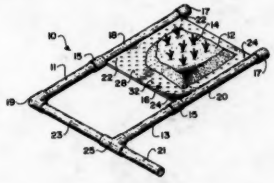
FLUID MANIFOLD

Ronald G. Minshull, P.O. Box 188, Sointula, British Columbia, Canada V0N 3E0

Filed Sep. 19, 1988, Ser. No. 246,267

Int. Cl.[4] A01G 29/00

U.S. Cl. 47—48.5 22 Claims



1. An apparatus for conducting fluid, the apparatus comprising:

(a) an integral first panel member having:

first and second relatively stiff non-porous sheet portions, the first sheet portion having a plurality of relatively stiff spacer means for maintaining the second sheet portion spaces apart from said first sheet portion to define a plurality of interior spaces therebetween; the sheet portions and the spacer means being sufficiently stiff to resist deformation due to fluid pressure differences thereacross and to imposed loads, the panel member also having first and second end portions in which at least one of said end portions has a first opening, said first opening and said plurality of apertures communicating with said interior space;

(b) a first manifold member having:

a wall with an interior portion surrounding an inside space, and an exterior portion, an end opening communicating with said inside space, and a connecting means for sealably connecting said manifold member to the first panel member, the connecting means being complementary to the end portion of the panel to receive the end portion of the panel, the connecting means including at least one opening in said wall for communicating between said inside space and said first opening of said first panel member to pass fluid between the manifold member and the panel member with neglible leakage therefrom.

4,887,387

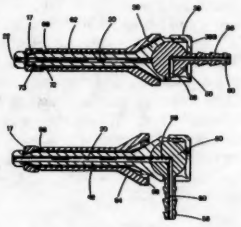
DEVICE FOR COLLECTING SAP

Dominique Lesquir, Buckland, Canada, assignor to IPL Inc., Quebec, Canada

Filed May 12, 1989, Ser. No. 350,894

Int. Cl.[4] A01G 23/00

U.S. Cl. 47—52 12 Claims



1. A device for collecting sap from trees comprising:

a first member having a hollow sap-collecting section having one end adapted to be inserted into a cavity formed in outer layers of a tree to be sapped, and an openable housing section integrally formed at the other end thereof; said sap-collecting section defining a sap passageway having one end opening in said cavity and an opposite end opening in said housing section; and

a second member having a head section movably mounted in said housing section, and a sap-discharging section adapted to be connected to a sap tubing system; said second member having communicating channel means in said head section and in said sap-discharging section; said head section being movable between a first position wherein said channel means of said head section is in fluid communication with said sap passageway of said sap-collecting section so that sap collected from the tree may be directed to the sap tubing system through said channel means, and a second position wherein said passageway is blocked by said head section at said one end.

4,887,388

IRRIGATION SYSTEM FOR COMMERCIAL PLANT CULTIVATION

Joseph Waltel, Jr., 10 Ruland Rd., Melville, N.Y. 11747

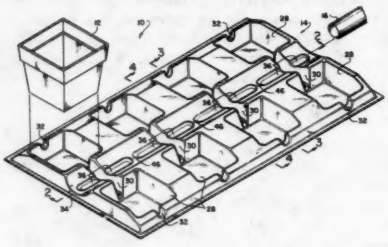
Filed Oct. 19, 1988, Ser. No. 260,473

Int. Cl.[4] H01G 25/00

U.S. Cl. 47—79 1 Claim

1. An irrigation system for growing plants located in individual containers, comprising a flexible, liquid-impervious hose having means therein for emitting therefrom liquid at a controlled rate along the length thereof, a plurality of individual

plant-accepting containers, each of said containers having liquid-passing means therein to allow the entry of liquid into the interior thereor for absorption by growing media and plants therein, and a tray body having plural recesses for accommodating said individual containers, said recesses being arranged in pairs along two rows extending along opposite sides of said tray body, and a central groove extending along the length of said tray body between said rows of recesses for receiving said liquid-supplying hose and for discharging the liquid emitted therefrom laterally into said pairs of plural recesses at discrete locations along said groove for absorption by said growing media and plants located in said individual containers, the flow rate for said hose being selected to match the rate of absorption of said liquid to minimize liquid transfer between said plural recesses, and for each adjacent pair of recesses a first transverse connecting passage for channeling the discharge from said hose into said recesses, and a second transverse passage on the opposite side of each said recess for discharging to a remote area any excess of said liquid channelled to said recess.

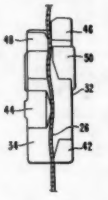


4,887,389

TILT LOCK JAMBLINER AND SLIDABLE BLOCK

Garry P. Haltof, Rochester, N.Y., assignor to Newell Manufacturing Company, Lowell, Mich.

Filed Mar. 16, 1988, Ser. No. 169,016
Int. Cl.[4] E05D *15/22*
U.S. Cl. 49—181 **33 Claims**



1. A tilt lock jambliner and slidable block for removably securing a window sash in a window jamb and enabling the window sash to slide vertically within the window jamb and to tilt inwardly comprising:

a jambliner for mounting in the window jamb comprising at least one channel, each said channel having a plurality of walls including a front wall having a vertical elongated slot, one said wall comprising a projecting fin along at least a portion of the length of said wall; and

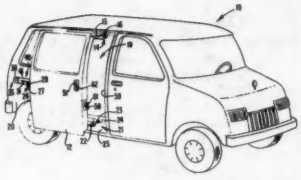
a slidable block slidably fitting within each said jambliner channel, said slidable block having a pivot bar receiving opening, a biasing mechanism receiving portion, and a plurality of projections for engaging said projecting fin to provide constant running friction, at least one said projection being disposed on each side of said projecting fin so that said projecting fin may be disposed between and weaved through said projections to form a friction wave.

4,887,390

POWERED SLIDING DOOR OPENER/CLOSER FOR VEHICLES

James G. Boyko, Gorham; Timothy J. Farrar, Buxton, and Stephen B. Peterson, Cape Elizabeth, all of Me., assignors to Masco Industries, Inc., Taylor, Mich.

Filed Dec. 18, 1987, Ser. No. 135,133
Int. Cl.[4] E05D *15/10*; E05F *15/00*
U.S. Cl. 49—214 **20 Claims**



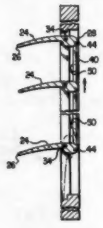
1. A door operator for a slide door that is slidingly supported relative to a door operating in a side panel of a vehicle body, said door being supported adjacent its forward end on at least one forward guide member and being supported adjacent its rear end on a rear guide member, said guide members guiding said door through an initial closing movement generally parallel to said side panel and through at least a portion of its final closing movement generally toward the plane of said door opening, said door operator comprising means including a cable member carried on the outboard side of said side panel and coupled to the rear end of said door for driving said door along said guide members to thereby move said door through said initial and final closing movements.

4,887,391

WINDOW SHUTTER ASSEMBLY AND METHOD OF PRODUCTION

Briggs, Sr. Kenneth W., Rice, Tex., assignor to Rushman Draperies, Inc., Dallas, Tex.

Filed Jun. 4, 1987, Ser. No. 58,146
Int. Cl.[4] E06B *7/086*
U.S. Cl. 49—90 **6 Claims**



1. A window shutter comprising:

(a) an open frame having a rectangular opening between inwardly facing first and second side faces, the first side face having at least one magnet-receiving recess formed thereon;

(b) a plurality of spaced elongate louvers extending substantially the entire distance between the side faces, each substantially identically mounted for pivotal movement with respect to the frame about a horizontal axis without horizontal movement;

(c) ganging means located adjacent the first side face linking

the plurality of louvers for common pivotal movements, said ganging means including a flat metallic bar lying slidably against the first side face, and pin portions extending into the ends of the louvers from the bar;

(d) position retaining means comprising at least one magnet mounted in the magnet receiving recess of the frame flush with the first side face and adjacent the metallic bar of the ganging means so that the bar slidingly confronts the magnet and the magnet serves to directly constrain the bar from unintended movement while permitting intended adjustment of the pivotal orientation of the louvers.

4,887,392

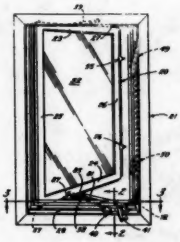
APPARATUS FOR ACTUATING AND LOCKING A WINDOW SASH

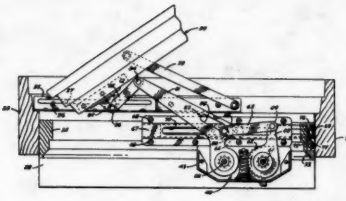
Robert F. Lease, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.

Continuation of Ser. No. 219,582, Jul. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 139,977, Dec. 31, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 338,441

Int. Cl.[4] E05F *11/00*

U.S. Cl. 49—300 **20 Claims**





1. Apparatus for moving a swingable window sash between open and closed positions relative to a fixed window frame and for releasably locking the sash in its closed position, said apparatus comprising a strike mountable on said sash, a latch mountable on said frame to move between locked and unlocked positions, said latch being operable when in said locked position to engage said strike and hold said sash in said closed position and being operable when in said unlocked position to release said strike and free said sash for movement away from said closed position, a reversible rotary actuator mountable on said frame, first and second linkages connected to said sash and said latch, respectively, said first linkage being responsive to said actuator to move said sash away from said closed position when said actuator is rotated in one direction and to move said sash toward said closed position when said actuator is rotated in the opposite direction, and said second linkage being responsive to said actuator to move said latch toward said unlocked position just prior to initial movement of said sash away from its fully closed position and to move said latch toward its locked position at about the same time said sash returns to its fully closed position, said second linkage including an element movable back and forth along the bottom of said frame, second linkage further including an elongated member connected to said element, said elongated member being laterally flexible and extending along the bottom of said frame and upwardly along one side of said frame, said elongated member being longitudinally stiff and being capable when pushed by said element to move said latch between said latched and unlatched positions.

4,887,393

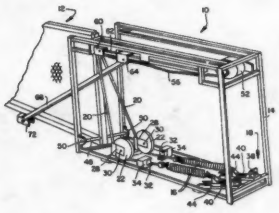
GATE ASSEMBLY

Jerome Cysewski, P.O. Box 1998, Billings, Mont. 59103

Filed Oct. 7, 1988, Ser. No. 254,715

Int. Cl.[4] E05D *7/00*

U.S. Cl. 49—385 **6 Claims**



1. A gate assembly comprising:

a gate;

a support structure;

an axle;

the support structure carrying the axle;

the gate mounted to the axle for rotation about the axle;

a rotating means for rotating the gate from a closed position through an over-center position to an open position and from the open position through the over-center position to the closed position; and

a counterbalancing assembly including:

a resilient means for providing a counterbalancing force to counterbalance the weight of the gate;

an adjustment means connected to the resilient means for adjusting the resilient force of the resilient means;

the resilient means having two ends with the first end being connected to the support structure;

a cable having two ends, the first end being connected to the second end of the resilient means and the second end being attached to the gate at a location spaced apart from the axle; and

a pulley, mounted on the support structure;

the cable being positioned, between the ends thereof, on the periphery of the pulley to extend partially around an axis of rotation of the pulley;

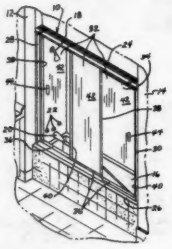
the cable being connected to the gate at a position where the counterbalancing force provided by the counterbalancing assembly urges the gate from the closed position to the open position when the center of gravity of the gate is on the closed position side of the over-center position and the pulley and the connection of the cable to the gate are respectively located to urge the gate from the open position to the closed position when the center of gravity of the gate is on the open position side of the over-center position.

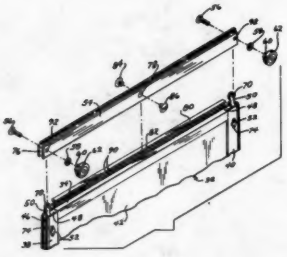
4,887,394

ADJUSTMENT APPARATUS FOR SUPPORTING A SLIDABLE DOOR

James L. Marlowe, Union City, Tenn., assignor to Sterling Plumbing Group, Inc., Schaumberg, Ill.

Filed Apr. 24, 1989, Ser. No. 342,115
Int. Cl.[4] E05D 15/06
U.S. Cl. 49—409 5 Claims





1. An adjustment apparatus for supporting a slidable door, comprising:

a bar-like pivotable frame member;

a pair of track followers mounted on the frame member;

a pair of stems, at least one of said stems being pivotally fastened to said frame member;

a door having upper and lower door edges and opposite side edges;

means for pivotally mounting the frame member to said upper door edge or said lower door edge;

means for mounting said stems in a sliding relationship with respect to said side edges; and

means for attaching at least one of said stems to one of said side edges;

whereby said frame member can pivot with respect to said door and thereby position said one stem relative to said one side edge.

4,887,395

WAVY-TILT-DAM SEAL RING AND APPARATUS FOR SHAPING SEAL RINGS

Alan O. Lebeck, Albuquerque, and Lionel A. Young, Edgewood, both of N. Mex., assignors to University of New Mexico, Albuquerque, N. Mex.

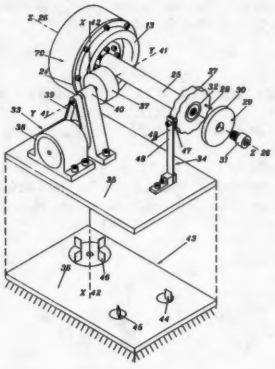
Division of Ser. No. 15,863, Feb. 17, 1987, Pat. No. 4,836,561. This application Sep. 2, 1988, Ser. No. 239,634
Int. Cl.[4] B24B 19/00, 19/26
U.S. Cl. 51—101 R 5 Claims

1. An apparatus for grinding or machining contours onto the face of a seal ring comprising:

spindle means for rotationally positioning a seal ring having a surface with a face in a plane to be ground or machined;

means comprising a grinding wheel turnable, within a rotational plane, about an axis of rotation;

means for flexibly mounting said grinding wheel means, said mounting means providing an axis of rotation therefor substantially perpendicular to said axis of rotation of said grinding wheel and in the plane of the face of the surface to be ground, said axis of rotation for said grinding means being disposed to intersect said axis of rotation of said face



plane at a preselectable position thereon and at a selectable distance from the rotational plane of said grinding wheel;

cam means for providing a machining contour; and

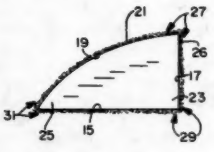
means for flexibly following said cam means operatively connected to said means for flexibly mounting said grinding wheel means, whereby the face of a seal ring can be machined to provide contours comprising radially tapered waves thereon.

4,887,396

DISPOSABLE SANDING DEVICE

Sergei G. Lukianoff, 2107 Van Ness Ave., San Francisco, Calif. 94109

Filed Aug. 12, 1988, Ser. No. 231,498
Int. Cl.[4] B24D 15/00
U.S. Cl. 51—391 6 Claims



1. A disposable sanding device comprising

a block having at least one working face and being fabricated of a lightweight, resilient material capable of substantially retaining its shape under applied sanding pressure, and

an abrasive surface relatively permanently provided on said working surface to provide a sanding surface thereon,

said block material having a greater density at location where said abrasive surface is likely to experience greater wear.

4,887,397

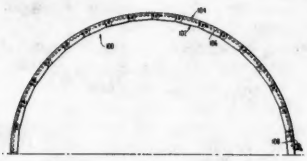
FAST, ERECTABLE, EASILY TRANSPORTABLE STRUCTURES

John M. Peterson, Madison, Ala., assignor to Teledyne Industries, Inc., Huntsville, Ala.

Continuation of Ser. No. 66,926, Jun. 29, 1984, abandoned. This application Oct. 19, 1988, Ser. No. 259,481

Int. Cl.[4] E04B *1/32*

U.S. Cl. 52—86 **26 Claims**



1. A collapsible structural member comprising:

a plurality of segmental sections adapted for longitudinal movement with respect to each other on a tensionable cable between a maximum spaced apart relationship and an abutting relationship wherein said segmental sections provide rigidity for said structural member, each of said segmental sections having a rigid, elongate body portion terminating in end portions in a longitudinal direction; and

means on said end portions for connecting an end portion of one of said segmental sections with the adjacent end portion of an adjacent said segmental section, said connecting means including first means for preventing said longitudinal movement of said connected adjacent end portions beyond said maximum spaced apart relationship and second means for permitting movement of said connected adjacent end portions between said maximum spaced apart relationship and said abutting relationship.

4,887,398

HYDRAULIC BUFFER TO PROTECT BUILDINGS AGAINST EARTHQUAKES

Hendrik Lenten, Westersingel 28, Sneek, Netherlands

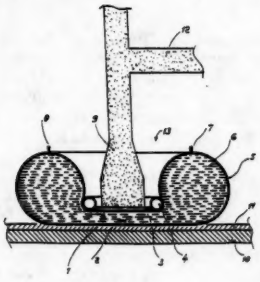
PCT No. PCT/EP87/00794, § 371 Date Aug. 15, 1988, § 102(e) Date Aug. 15, 1988, PCT Pub. No. WO88/04710, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 18, 1987, Ser. No. 246,538

Claims priority, application Netherlands, Dec. 22, 1986, 8603259

Int. Cl.[4] E04H *9/02*; E04B *1/98*

U.S. Cl. 52—167 R **3 Claims**



1. A hydraulic buffer for absorbing large transverse displacements between a supporting surface and a structure, the buffer comprising:

an impervious envelope made of flexible material, the envelope including a first circular upper plate portion, a second circular base plate portion spaced from and coaxial with the first circular plate portion, and a hollow torus having a wall coaxially surrounding and connecting the first and second circular plate portions, the wall of the torus and the first and second plate portions forming a continuous surface, and the hollow interior of the torus communicating freely with the space between the first and second plate portions;

a liquid-like material filling the space between the first and second plate portions and at least partially filling the hollow torus; and

a rigid disc placed on the flexible material of the first circular upper plate portion to provide a bearing surface for the structure, the disc having a rounded circumferential edge to provide a smooth transition from the circumference of the upper plate portion to the connecting wall of the torus.

4,887,399

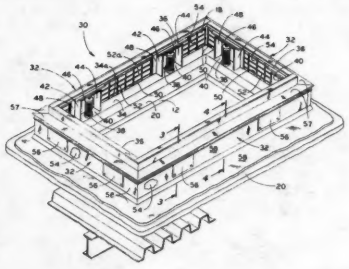
SOUNDPROOF ROOF CURB

Richard C. Berger, Off Split Rock Rd., Syosset, N.Y. 11791, and Paul L. Berger, 28 Moss La., Jericho, N.Y. 11753

Filed Dec. 17, 1984, Ser. No. 682,683

Int. Cl.[4] E04B *7/18*

U.S. Cl. 52—27 **1 Claim**



1. A soundproof roof curb of the type operatively disposed above a roof opening and having an air handling unit mounted thereon above said roof opening, said curb support comprising four sides bounding a sound chamber necessarily created between said roof opening and said air handling unit and in each curb support side there being an opening of a size that is substantially the entire size thereof in communication with said sound chamber, a closure disposed externally in covering relation over each said opening, and board means having sound-absorbing and weather-proofing properties supported externally on said closure, said closure being in the specific form of a wire mesh having openings throughout so that sound created in said sound chamber is subject to removal by absorption into said board means by the contact therewith through the openings in said wire mesh.

4,887,400

GRANULAR MATERIAL STORAGE SYSTEM

Michael W. Carroll, 250 Lincoln Ave., Roselle, Ill. 60172

Filed Jun. 10, 1988, Ser. No. 205,121

Int. Cl.[4] E04H *7/22*

U.S. Cl. 52—195 **22 Claims**

1. In a storage system for flowable granular material delivered by a conveyor to the center of a generally conical pile, the combination comprising:

a flexible cover for lying on the top of the pile;

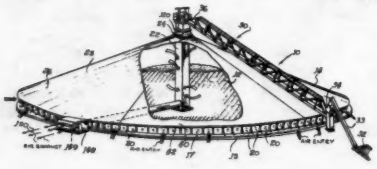
a tower located at a central portion of the cover and of the grain pile;

a distributor mounted on an upper end of the tower and receiving granular material from the conveyor at the

upper end of the tower and for dropping the granular material downwardly along the tower and for distributing the granular material under the cover and for making the pile more even about the tower as the pile grows radially outwardly from the tower;

an upper receiving chamber in the distributor for receiving a flow of granular material from the conveyor;

a means for moving the central portion of the cover upwardly along the tower as the conical pile grows in height,



a plurality of selectively positionable discharge ports around the circumference of the tower for receiving granular material connected to the upper receiving chamber and having openings for discharging variable amounts of granular material in stream having a size dependent on which side of the pile needs more material to keep the pile substantially even about the tower for radial flow outwardly from the tower and beneath the movable cover as the cover raises during filling.

4,887,401

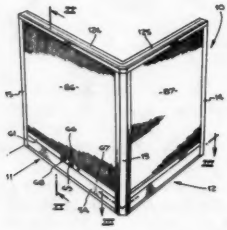
KNOCK DOWN PARTITION WALL ASSEMBLY

Thomas J. Gioscia, 25558 Fedala Rd., Valencia, Calif. 91355

Filed Apr. 18, 1988, Ser. No. 182,941

Int. Cl.[4] E04F *17/08*

U.S. Cl. 52—221 **18 Claims**



1. In a knock down wall assembly comprising:

at least one elongated base section (**11** or **12**), said base section (**11** or **12**) having a planar rear wall (**16**), a top partition (**20**) and a bottom partition (**22**), said base section (**11** or **12**) being normally open at each end and divided internally into at least a pair of elongated upper and lower chambers (**23**) (**23**) normally open along the side thereof opposition said rear wall (**16**) separated by a partition (**21**), said upper and lower chambers (**23**) (**24**) being normally open on the side of said base section (**11** or **12**) opposite said rear wall (**16**), a pair of elongated tracks (**50**, **48**; **60**, **41**; **52**, **53**; and **47**, **49** extending along top and bottom of the normally open side of each of said chambers (**11**, **12**), a removable elongated planar panel snapfitting into top and bottom tracks formed at the top and bottom of one of the normally open sides of one of said chambers (**23** or **24**) closing off substantially the entire normally open side thereof, a first removable elongated planar panel section (**61** or **67**) snap-fitting into top and bottom tracks formed at the top and bottom of said normally open side of the other of said chambers (**23** or **24**), and at least a second removable elongated planar panel section (**66**) snap-fitting into the top and bottom tracks of said normally open side of the other of said chambers adjacent said first panel section (**61** or **67**), said second panel section (**66**) having at least one conventional electronic apparatus female connector (**68** or **69**) therein opening away from said second panel section.

4,887,402

STRUCTURAL GLAZING SYSTEM

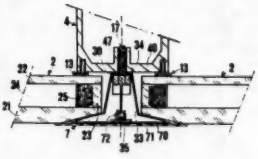
Diego Da Col, Via Benedetti 43, 37135 Verona, Italy, assignor to Diego Da Col, Verona, Italy

Filed Aug. 1, 1988, Ser. No. 226,927

Claims priority, application Italy, Aug. 7, 1987, 84963 A/87

Int. Cl.[4] E04H *1/00*

U.S. Cl. 52—235 **15 Claims**



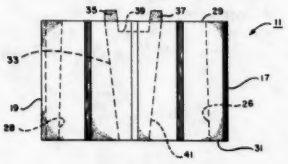
1. A structural glazing system for obtaining continuous glazed facades comprising a structural framing including a plurality of uprights and transoms securable to a supporting structure of a building to be glazed, a plurality of panels, concealed supporting and mounting means clamping said panels to said structural framing to form, in use, a mosaic of coplanar panels defining a continuous glazed facade, said panels being separated from each other by uninterrupted gaps, and a plurality of gap-covering section elements arranged, in use, at said uninterrupted gaps between adjacent panels and being substantially flush with said panels, said gap-covering section elements comprising a sheet-like slate portion having an outer and an inner face, said outer face being arranged, in use, substantially flush to said panels, said inner face defining coupling means arranged for protruding within said uninterrupted gaps and removably cooperating with said supporting and mounting means for removably securing said gap-covering section elements to said structural framing and providing uniformity and continuity to said panel mosaic.

4,887,403

INTERNALLY INDEXED BUILDING BLOCK AND METHOD OF CONSTRUCTION

David W. Bonner, 2407 Millikin Dr., Arlington, Tex. 76012

Filed Jun. 17, 1988, Ser. No. 209,191
Int. Cl.[4] E04C *1/10*
U.S. Cl. 52—286 9 Claims



1. An internally indexed building block, comprising:

a body having opposed side walls and opposed end walls which define an internal cavity therebetween and upper and lower block faces, the faces being arranged so that the upper and lower faces of one block may receive similar blocks layed in overlying and underlying relationship to form courses of blocks;

a web located within the block internal cavity and dividing the internal cavity into a pair of vertical cells, the web terminating at one extent in a pair of vertically extending keys which extend above the block upper face and which span a dish region, the dish region being located within the block internal cavity and being depressed below the block upper face; and

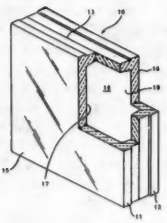
wherein the web forms two key receiving openings on the block lower surface, and wherein each vertically extending key on the block upper surface is adapted to be received within one of the key receiving openings of another block which is arranged in overlying relationship in a course of blocks, the vertically extending keys being centrally located within the internal cavity to thereby form a protected interior fitting which is spaced-apart from the block end walls when the keys are received within the key openings of another block arranged in overlying relationship in a course of blocks.

4,887,404

TRANSLUCENT GLASS BRICK MADE OF OPAL GLASS WITH LIGHT DIFFUSIBLE CRYSTAL PARTICLES

Kosaburo Saji, Nagahama; Shigeru Yamamoto, Kyoto, and Katsuhiko Imai, Otsu, all of Japan, assignors to Nippon Electric Glass Company, Limited, Otsu, Japan

Filed Jun. 14, 1988, Ser. No. 206,713
Claims priority, application Japan, Jun. 16, 1987, 62-149588; Jun. 17, 1987, 62-150539
Int. Cl.[4] E04B *5/46;* E04C *1/42;* B22B *17/06*
U.S. Cl. 52—306 4 Claims



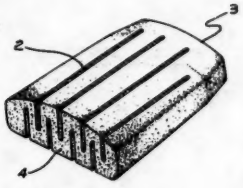
1. A translucent glass brick for use in a building wall, said translucent glass brick being a hollow body of glass, the improvement wherein said glass is an opal glass which comprises light transparent glass matrix and fine particles dispersed in said matrix for diffusing light transmitting through said glass, said glass having an opal appearance and a mean light transmittance of 20–80%, in a glass thickness of 10 mm, for wavelength over a range of 400–700 nm.

4,887,405

COMPRESSIBLE FOAM INSERT FOR BUILDING BLOCKS

Jeffrey A. Nickerson, Nelson Street - P.O. Box 592, Warren, Mass. 01083

Filed Jan. 27, 1989, Ser. No. 302,620
Int. Cl.[4] E04B *1/80*
U.S. Cl. 52—309.12 3 Claims



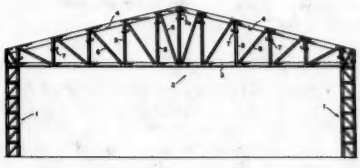
1. Insulating foam insert for building blocks shaped to conform to the cores of different sizes and shapes of building blocks, said insert comprising an integral foam body of generally rectangular overall shape having upper and lower surfaces, sidewalls and a front and back face, said insert being inwardly tapered in cross-section from its lower to its upper surface and compression slots which extend upwardly from the lower surface of the insert and terminate a substantial distance below the upper surface thereof which is thereby solid in cross-section and prevents the upward escape of heated air from said slots, alternate of said compression slots extending in opposite directions from one face toward the opposite face thereof a distance greater than one-half the cross-sectional width of said insert such that the compression slots are coextensive within the body of the insert whereby compressibility is enhanced laterally of the coextensive portions of said slots.

4,887,406

STRUCTURAL MEMBER FOR BUILDINGS

Wilburn H. F. Sais, 2959 River Road, Rt. 4, Midland, Mich. 48640

Filed Dec. 31, 1987, Ser. No. 140,119
Int. Cl.[4] E04C *3/02*
U.S. Cl. 52—694 24 Claims



1. A structural member for use in the construction of a building, said member comprising an upper chord; a lower chord, said chords being of substantially equal length and vertically spaced from one another; an end plate at each end of said member joined to and maintaining said chords in spaced apart, substantially parallel relation; and a plurality of diagonal struts secured to and extending vertically between said chords at spaced intervals, each of said chords extending in opposite

directions laterally of said struts at a selected angle thereto, each of said chords comprising a pair of angular elements each of which has a vertical first flange and a second flange extending at an angle from said first flange, the vertical flanges of said elements being secured to one another and the second flanges of said elements extending in prolongation of each other.

4,887,407

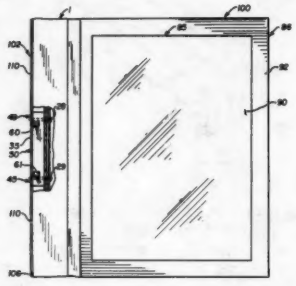
ALIGNMENT CLIP MEMBER FOR WINDOWS AND ASSOCIATED METHOD

Dwight C. Nelson, Cherry Tree, Pa., assignor to Season-all Industries, Inc., Indiana, Pa.

Division of Ser. No. 123,776, Nov. 23, 1987. This application Mar. 9, 1989, Ser. No. 321,192

Int. Cl.[4] E04G *21/14*

U.S. Cl. 52—745 **5 Claims**



1. A method of positioning a window assembly in a window receiving opening comprising

providing a window assembly consisting of at least one window sash disposed in a window frame having a recess, said window frame having an alignment clip member operatively associated therewith, said alignment clip member consisting of base means for positioning within said recess of said window frame, alignment clip element means adjacent to said base means having deformable tab means for adjusting the spacing between said window frame and said window receiving opening, spring means operatively associated with said base means and said alignment clip element means for biasing said base means with respect to said alignment clip element means, and screw means engaging said alignment clip element means, said window frame and said window receiving opening,

compensating for gaps between said window assembly and said window receiving opening by inserting said window assembly into said window receiving opening, and

adjusting said alignment clip member, whereby said window assembly is properly installed and positioned in said window receiving opening.

4,887,408

METHOD OF MANUFACTURING PACKS OF CIGARETTES WITH A HERMETICALLY SEALED WRAPPER

Riccardo Mattei, and Gastone Dall'Osso, both of Bologna, Italy, assignors to G.D. Societa Per Azioni, Bologna, Italy

Filed Jun. 21, 1988, Ser. No. 209,320

Claims priority, application Italy, Jun. 23, 1987, 3527 A/87

Int. Cl.[4] B65B *11/32, 61/18*

U.S. Cl. 53—412 **3 Claims**

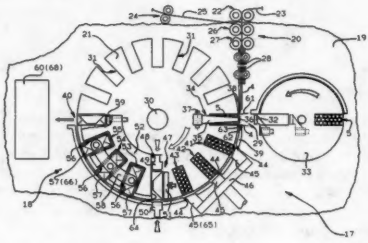
1. A method of manufacturing a pack of cigarettes with a hermetically sealed wrapper, comprising the steps of:

(a) introducing a group of cigarettes, together with a sheet of heat-sealable wrapping material, into a pocket of an indexed wrapping wheel;

(b) maintaining the group of cigarettes and the relative sheet of wrapping material in position internally of the pocket, using an initial retention element;

(c) folding the sheet of wrapping material into a sheath peripherally around the group of cigarettes, using first fixed and movable folding elements, so that the sheath has two overlapping flaps and two open ends which project axially beyond respective ends of the cigarettes;

(d) holding the two overlapping flaps of the sheath of wrapping material correctly positioned, using a first fixed retaining element and while so doing, fusing together the two overlapping flaps of the sheath using a first heat-sealing element so that the sheath forms a tube open at both ends;



(e) folding-in the projecting open ends of the sheath to form the top and bottom ends of the wrapper, using second fixed and movable folding elements;

(f) holding the top and bottom end folds correctly positioned, using a second fixed retaining element and while so doing, fusing the top and bottom folds, using second heat-sealing elements to provide a hermetically sealed finished wrapper; and

(g) ejecting the finished wrapper from the pocket of the indexed wrapping wheel.

4,887,409

METHOD AND MEANS FOR MAKING SEGMENTED COSMETIC ARTICLES

Gary Israel, West Nyack, N.Y.; Andrew Nadzan III, Union, N.J., and William Deierlein, Monsey, N.Y., assignors to Avon Products, Inc., New York, N.Y.

Filed Jun. 24, 1988, Ser. No. 211,328

Int. Cl.[4] B65B *1/24*

U.S. Cl. 53—436 **9 Claims**

1. Apparatus for making segmented compressed powder articles comprising:

means for containing compressed powder,

means for storing powder to be compressed in separate compartments, and

means cooperatively engaging said storing means, said cooperatively engaging means being adapted to compress said powder stored in said separate compartments into said containing means whereby said powder in said separate compartments forms contiguous segments of compressed powder in said containing means,

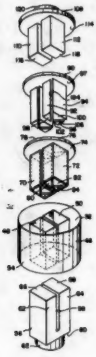
said storing means including separate compartments having at least a first and second shape and said contiguous segments of compressed powder in said containing means conforming respectively to said first and second shape,

said containing means comprising a shallow pan and said storing means comprising a sleeve having at least one dividing wall therein to form at least first and second compartments interiorly of said sleeve, said cooperatively engaging means being adapted to cause powder in said first and second compartments to be compressed into said shallow pan,

means for supporting said pan relative to said sleeve, said

cooperatively engaging means comprising piston means having separate portions disposed in said first and second compartments, said separate portions being shaped to conform to the shape of said first and second compartments, respectively, and adapted to be slidable relative to and within said sleeve,

means for moving said piston means relative to said sleeve



sufficient to form a block of partially compressed powder in said sleeve, and means for moving said sleeve relative to said piston means separate portions whereby the extremity of said sleeve is spaced from said pan at least by the distance said block of partially compressed powder extends beyond said pan, said relative movement occurring while said piston means separate portions remain in engagement with said partially compressed block of powder.

4,887,410

PROCESS AND APPARATUS FOR THE PRODUCTION OF PACKAGES OF COSMETIC PRODUCTS WITH POWDERS OF DIFFERENT CHARACTERISTICS

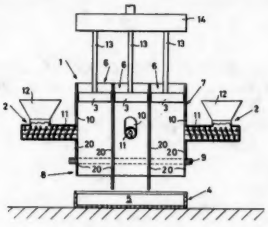
Luigi Gandini, Cavenago Brianza, Italy, assignor to Dosa-Pack S.R.L., Italy

Filed Jun. 15, 1988, Ser. No. 207,297

Claims priority, application Italy, Jul. 20, 1987, 21352 A/87

Int. Cl.[4] B65B *1/24*

U.S. Cl. 53—436 **5 Claims**



1. Process for production of packages of cosmetic products with powders of different characteristics, comprising the steps of:

temporarily subdividing a container into a plurality of sectors, each of the sectors being assigned to contain a powder, including powders of different characteristics, by placing into the container a means of temporary subdivision;

filling such sectors with said powders;

partially pressing such powders;

removing said means of temporary subdivisio from the container; and,

finally pressing the powders contained in the container.

4,887,411

APPARATUS FOR FILLING BAGS OR POUCHES WITH A PERFUSION LIQUID

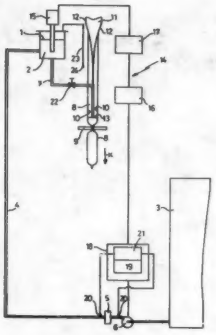
George Rondeau, Braffe, Belgium, and Pierre Soubrier, Chateauneuf Sur Sarthe, France, assignors to Baxter International Inc., Deerfield, Ill.

Filed Jun. 24, 1988, Ser. No. 211,481

Claims priority, application Belgium, Jun. 25, 1987, 08700702

Int. Cl.[4] B65B *3/26*

U.S. Cl. 53—493 **15 Claims**



1. An apparatus for continuously filling flexible bags or pouches with a perfusion liquid comprising: a reservoir that is fed perfusion liquid from a source of such liquid, means for regulating the rate of flow of the perfusion liquid coming out of the reservoir, as a function of the level of the perfusion liquid in the reservoir, a sensor mounted in the reservoir which sends an electronic signal that varies as a function of the perfusion liquid level in the reservoir, and a regulator electronically connected to the sensor for receiving the electronic signal, the regulator continuously regulating the feeding of perfusion liquid to said reservoir as a function of the electronic signal, the sensor and the regulator together operating to maintain the perfusion liquid level in reservoir near to a pre-set level.

4,887,412

WRAPPING MACHINE

Yoshiyuki Takamura, Nagoya, Japan, assignor to Fuji Pack Systems, Ltd., Nagoya, Japan

Filed Aug. 4, 1988, Ser. No. 228,959

Claims priority, application Japan, Aug. 7, 1987, 62-198651; Jan. 13, 1988, 63-6538

Int. Cl.[4] B65B *59/02*

U.S. Cl. 53—504 **12 Claims**

1. A wrapping machine used to wrap with a prescribed wrapper a commodity having the shape of a hexahedron having a length, a width, and a height, as well as a top surface, a bottom surface, a front surface, a rear surface, a right side surface, and a left side surface,

in this wrapping machine, the commodity being wrapped in a wrapping region, this wrapping region having a central position along the length of the commodity, and a reference wrapping position along the width of the commodity,

the wrapping machine further comprising:

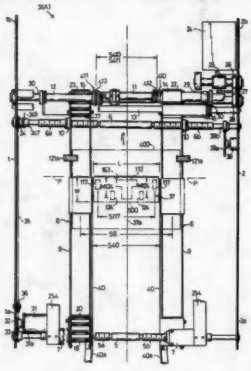
a wrapper supply means that holds at least two wrappers of

different sizes, and selectively supplies either of the wrappers to the wrapping region,

a sensing means, provided in the wrapper supply means, that detects the sizes of the wrappers,

a control means electrically connected to the sensing means, as well as operationally connected to the wrapper supply means; this control means has a display means, and it determines whether the sizes of the wrappers are within the usable range for wrapping the commodity or not; when the sizes of two or more of the wrappers are within the usable range for wrapping the commodity, it drives the wrapper supply means to supply either of the wrappers to the wrapping region; when only one of the wrappers has the size within the usable range for wrapping the commodity, it drives the wrapper supply means to supply the usable wrapper to the wrapping region; when neither of the sizes of the wrappers is within the usable range for wrapping the commodity, it displays the size of the wrapper capable of wrapping the commodity on the display means, and

a wrapper folding means, provided near the vicinity of the wrapping region, that wraps the commodity in the wrapping region with the wrapper supplied from the wrapper supply means.



4,887,413

BULK SAMPLER TOOL

Robert W. Tuckey, Jr., 9936 Woodfern Rd., Philadelphia, Pa. 19115

Filed May 26, 1988, Ser. No. 199,052
Int. Cl.[4] B65B *63/00*
U.S. Cl. 53—520 **2 Claims**

1. A tool for removing and packaging a dry sample section from a building wall suspected of containing asbestos, comprising:

an annular cylindrical rotary cutter having an inner side surface and an outer side surface, a handle element (22) carried on said cutter, one end of said annular cutter remote from the handle element being sharpened for penetrating a building wall when a rotary actuating force is applied to the handle element, whereby a sample of the wall is received within

a sample ejector located within the annular cutter to remove a sample from the cutter, said sample ejector comprising a plunger having a close sliding fit on the inner said surface of the cutter, the inner side surface of the cutter having a constant diameter over the entire length thereof traversed by the plunger so that sample fragments are prevented from adhering to side surface areas of the plunger or the cutter, said ejector extending out of the cutter to provide an external actuator section for manual movement of said plunger back and forth within the cutter;

an annular cup-like canister encircling said cutter; said canister comprising an imperforate annular side wall having an inner side surface spaced radially from the outer side surface of the cutter, said canister further including an end wall (29) extending across one end of the canister side wall;

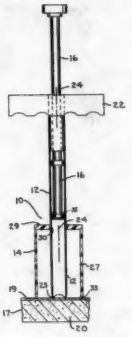
said canister end wall having a circular opening therethrough mated to the outer side surface of the cylindrical cutter, such that the canister is capable of axial movement along the cutter to a position entirely removed from the cutter;

the canister side wall defining an open mouth adapted to engage the surface of a building wall while the cutter is being operated to cut into the wall material, the aforementioned

radial spacing of the canister side wall and cutter side surface being such that a dust-reception space is formed between the cutter and canister;

a first relatively large diameter cap installable on the open mouth of the canister prior to operation of the ejector whereby the sample is ejected into the confined space defined by the first cap and the canister side wall;

and a second relatively small diameter cap installable in the circular opening in the canister end wall after the ejector has been operated to eject the sample into the canister, whereby the sample and associated fragments are sealed within the canister.

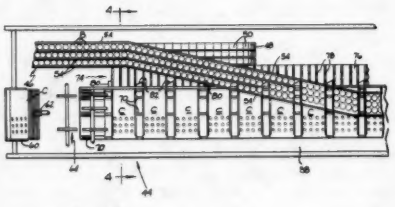


4,887,414

ARTICLE SEPARATING AND LOADING APPARATUS

John P. Arena, Downsville, La., assignor to Manville Corporation, Denver, Colo.

Filed Sep. 6, 1988, Ser. No. 240,975
Int. Cl.[4] B65B *21/06, 35/44*
U.S. Cl. 53—543 **3 Claims**



1. In a machine for packaging articles in a carton:

first conveyor means for moving a plurality of adjacent rows of articles in a downstream direction;

means laterally spaced from the first conveyor means for moving spaced carton blanks in said downstream direction;

second conveyor means between the first conveyor means and the carton blank moving means, the second conveyor means extending in said downstream direction;

a plurality of spaced parallel stationary guide rails mounted above the first and second conveyor means and extending diagonally from the first conveyor means, across the second conveyor means to the carton blank moving means, the second conveyor means moving the plurality of adjacent rows of articles and the guide rails guiding the moving adjacent rows of articles along a predetermined diagonal path of travel; and

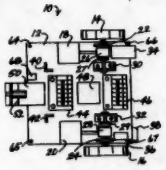
wedge means on the second conveyor means adjacent the carton blank moving means, the wedge means extending upwardly from the second conveyor means and laterally in a direction away from the carton blank moving means over a portion of the width of the second conveyor means, the wedge means being substantially aligned with the spaces between adjacent carton blanks and being positioned to contact and wedge apart adjacent articles in the nearest row of diagonally moving articles on the second conveyor means and to subsequently sequentially contact adjacent rows of diagonally moving rows of articles on the second conveyor means, the wedge means thereby separating the articles into groups of predetermined number, whereby groups of articles are moved onto the moving carton blanks.

4,887,415

AUTOMATED LAWN MOWER OR FLOOR POLISHER

Robert L. Martin, 34 Woodside Dr., Belleville, Ill. 62223

Filed Jun. 10, 1988, Ser. No. 204,886
Int. Cl.[4] E21B *34/64*
U.S. Cl. 56—10.2 **1 Claim**



1. A new and improved automated lawn mower, comprising:

a frame having top and bottom surfaces;

a pair of drive wheels mounted for rotation on opposite sides of said frame, adjacent a front portion of said frame;

each of said wheels mounted for rotation with an axle;

each of said axles connected by a clutch to a gear reduction unit;

each of said gear reduction units having dual output shafts with one output shaft connected to said clutch;

a second output shaft of each of said gear reduction units mounted by a bearing block on said frame;

a rotary photo encoder on each of said second gear reduction output shafts;

a wheel drive motor connected to an input shaft of each of said gear reduction units;

a photo switch at a front edge of said frame for detecting uncut grass;

a vertically extending shaft extending through a central portion of said frame;

a variable speed blade drive motor on said upper frame surface connected to said vertically extending shaft;

switch means for manually regulating the speed of said blade drive motor;

a mower blade mounted for rotation with said vertically extending shaft beneath said frame;

a castor wheel centrally mounted adjacent a rear side of said frame;

a touch grass sensor formed from three metallic strips mounted on a rear side edge of said frame for detecting cut and uncut grass;

battery means operably connected for powering both of said wheel drive motors and said blade drive motor;

an infrared obstacle detector mounted at each corner on the upper surface of said frame;

control means operably connected for stopping said blade drive motor in response to said photo switch; and

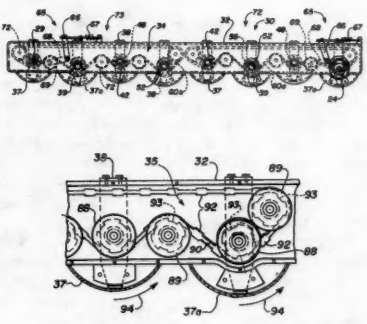
computer control means operably connected for independently controlling each of said wheel drive motors in accordance with signals received from said touch grass sensor, said rotary photo encoders and said infrared obstacle detectors for steering said motor along a boundary line between cut and uncut grass.

4,887,416

TIMING BELT FOR DISC CUTTERBARS

Jack W. Crane, New Holland; L. Lavern Anstee, Leola; Robert M. VanGinhoven, Lancaster, and Richard E. Jennings, Manheim, all of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Sep. 2, 1988, Ser. No. 240,870
Int. Cl.[4] A01D *34/66, 55/00*
U.S. Cl. 56—13.6 **11 Claims**



1. In a disc mower-conditioner having a frame; a disc cutterbar supported from said frame for engagement with standing crop material to effect a severing thereof, said disc cutterbar including a hollow transmission casing rotatably supporting a plurality of disc cutters having at least one knife connected thereto and rotatable therewith to sever standing crop material by impact action, said disc cutterbar further including a drive transmission means within said transmission casing and engageable with said disc cutters to transfer rotational power to said disc cutters; conditioning means supported by said frame rearwardly of said disc cutterbar to receive severed crop material therefrom for conditioning thereof and subsequent discharge to the ground; and drive means operably associated with said drive transmission means to provide rotational power thereto, an improved drive transmission means comprising:

a toothed sprocket affixed to each said disc cutter for rotation therewith;

an endless double sided timing belt entrained around all of said toothed sprockets to transfer rotational power therebetween, said timing belt having first and second sides thereto with teeth having a configuration matching said

toothed sprockets located on both said first and second 24 sides; and

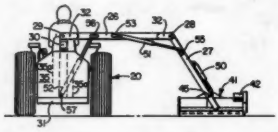
said disc cutters being mounted on the transmission casing to provide an overlap area between adjacent disc cutters, the path of rotation of the knives on adjacent disc cutters passing through said overlap area in non-interferring planes, the forward periphery of the path of rotation of all said disc cutters being in substantially the same plane to provide a substantially uniform level of cut.

4,887,417

BOOM MOWER ATTACHMENT FOR A TRACTOR ADJUSTABLE FOR CUTTING AT EITHER SIDE THEREOF

Ralph L. Parsons, Jr., 1795 Olmstead Rd., West Jefferson, Ohio

Filed Feb. 17, 1988, Ser. No. 156,816
Int. Cl.[4] A01D *34/66, 34/86*
U.S. Cl. 56—15.2 15 Claims



1. In combination, a tractor having parallel rear wheels, said tractor having a power take-off, said tractor being connected to a support by a hitch, a boom having inner and outer ends pivotally mounted at its inner end to said support by a first pivot, a work unit pivotally mounted by a second pivot to the outer end of said boom, and a first piston and cylinder unit pivotally connected at its inner end to said support by a third pivot and to said boom intermediate the ends of said boom,

said boom being mounted to extend in a vertical plane transverse to the orientation of said wheels,

said work unit including a cutting tool, said tool being partially enclosed by a housing, means for pivoting said housing about said second pivot through a vertical angle of up to about 210° relative to said boom for purposes of orienting the cutting tool, said housing being aligned to pivot in a plane offset and parallel to the plane of said boom,

means for pivoting said boom in said vertical transverse plane about said first pivot through an angle of up to about 210°.

4,887,418

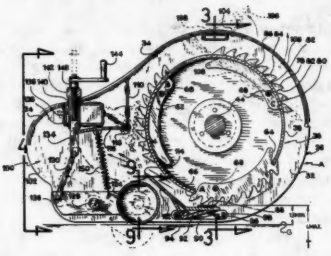
APPARATUS FOR MOWING, CHIPPING AND BLOWING

Guy Pelletier, Belmont Street, P.O. Box 251, Melbourne, Canada (J0B 2B0)

Filed Jul. 5, 1988, Ser. No. 214,372
Int. Cl.[4] A01D *34/52, 34/53, 34/54*
U.S. Cl. 56—249.5 19 Claims

1. An apparatus for use as a mower or chipper, comprising:

a support, a power-driven rotor rotatably mounted on said support, said rotor having a cylindrical wall provided with helically-arranged, elongated slits, blades removably inserted in said slits and protruding from said cylindrical wall, each blade having a series of teeth disposed along a



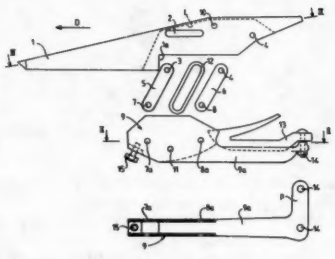
portion of a helix co-axial with said rotor, and fixing means to releasably fix said blades to said rotor.

4,887,419

LIFTER APPARATUS OF VARIABLE GEOMETRY FOR CROPS WHICH ARE LEANING

Gérard Bouin, 9, rue de la Gravelle 86220, Dange-Saint-Romain, France

Filed Aug. 3, 1988, Ser. No. 227,779
Claims priority, application France, Aug. 4, 1987, 87 11108
Int. Cl.[4] A01D *65/02*
U.S. Cl. 56—319 7 Claims



1. A harvesting lifter device intended for adaptation to any cutter bar of a harvesting machine of the type having a support element intended to be fixed to a guide of the cutter bar and a lifter element, means connecting said lifter element to said support element for relative movement, said connecting means comprising first and second rocker bars each having opposite ends with means rotatably engaging respectively said lifter element and said support element, said lifter element having a slot and said means rotatably engaging said first rocker bar including a swivel shaft disposed in said slot and slidable therein between a first position corresponding to a state of repose of said lifter element wherein said lifter element is above the ground to a second position corresponding to a working state wherein said lifter element will have a portion thereof engaging the ground.

4,887,420

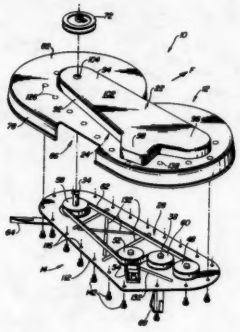
MODULAR MOWER DECK WITH LIGHT-WEIGHT HOUSING

John R. Cerny, Jr., Bettendorf, Iowa; Jay H. Olson, Moline, Ill.; James W. Hall, Bettendorf, Iowa, and Leon P. Erdman, Beaver Dam, Wis., assignors to Deere & Company, Moline, Ill.

Filed Oct. 31, 1988, Ser. No. 264,414

Int. Cl.[4] A01D *34/66*

U.S. Cl. 56—320.2 24 Claims



1. A mower deck assembly for a blade mower comprising:

a unitary housing fabricated from a plastic or laminate material, said housing including a domed upper portion forming a downwardly opening cavity within the housing, and an upper deck portion extending outwardly from the lower portion of the domed portion;

a rigid support plate;

a blade drive including a spindle assembly adapted for receiving the mower blade, and means for connecting the blade drive to the rigid support plate for support of the blade drive substantially entirely by the support plate; and

means for attaching the support plate, with the blade drive connected thereto, to the housing adjacent the lower portion of the domed portion with the blade drive extending upwardly into the cavity.

22. A method of fabricating a mower deck for a blade mower including the steps of:

(a) forming a light-weight housing having a raised upper portion defining a downwardly opening cavity and an upper deck portion extending outwardly from the upper portion;

(b) fabricating a modular blade drive assembly including mounting a blade spindle and a blade drive on a rigid plate member.

4,887,421

APPARATUS AND PROCESS OF MANUFACTURING A METAL CORD

Gary A. Haislet, Asheboro, N.C., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 23, 1983, Ser. No. 554,402

Int. Cl.[4] D01H *1/10, 7/86, 7/90*

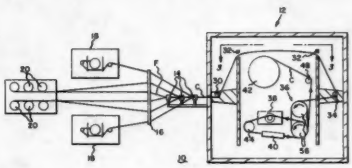
U.S. Cl. 57—58.54 8 Claims

1. A method of forming a multiple filament cord of multiple layers in a single step operation which cord is free of strands and having all the filaments twisted in the direction of lay of the cord comprising the steps of:

applying a twist to the outer layer filaments in a direction opposite from that to be applied to all the filaments in the cord;

applying a twist to all the filaments in the cord resulting in a reduction of stress in the outer filaments to more closely approximate that of the inner filaments;

thereafter applying a false twist to all the filaments in the cord; and



setting the twist in all the filaments subsequent to the false twist operation to give the cord its final shape.

4,887,422

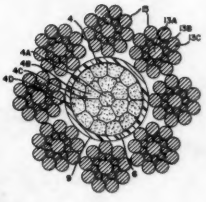
ROPE WITH FIBER CORE AND METHOD OF FORMING SAME

David A. Klees; Robert B. Hoganson, and Harry L. Data, all of Kenosha, Wis., assignors to AMSTED Industries Incorporated, Chicago, Ill.

Filed Sep. 6, 1988, Ser. No. 241,052

Int. Cl.[4] D07B *1/06*

U.S. Cl. 57—220 20 Claims



1. A rope comprising

a core comprising a plurality of helically twisted elements, each element comprising a plurality of helically twisted high strength synthetic yarns,

and outer strands arranged in a helical pattern surrounding said core, each of said outer strands comprising a plurality of helically twisted metal wires,

with the rope achieving a balanced set of helices whereby the elastic modulus of the core and the elastic modulus of the outer strands are about equal.

4,887,423

METHOD FOR TINTING AND FURTHER PROCESSING OF AT LEAST ONE LIGHT WAVEGUIDE

Peter Dotzer, Munich; Heinz Glaser, Germering; Reinhold Hahn, Munich, and Ernst Mayr, Starnberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,116

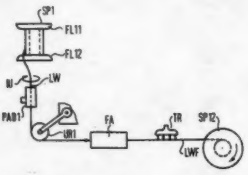
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809608

Int. Cl.[4] G02B *6/04, 6/44;* D01H *13/30*

U.S. Cl. 57—295 4 Claims

1. A method for the tinting and further processing of at least one tinted light waveguide for the manufacture of a light waveguide device, said process comprising the steps of a first hauling-off of a light waveguide with an overhead haul-off in a first direction from a first supply reel, preserving a haul-off twist applied to the light waveguide during the first hauling-off and tinting the hauled-off light waveguide, winding the tinted light waveguide in a tangential direction on a power-driven second supply reel, performing a second hauling-off with an

overhead haul-off from the second supply reel to provide the tinted waveguide for further processing, said second hauling-off being in a second direction which is opposite to the first



direction so that the torsion produced in the second overhead hauling-off cancels the torsion and twist produced by the first hauling-off.

4,887,424

PROPFAN TURBINE ENGINE

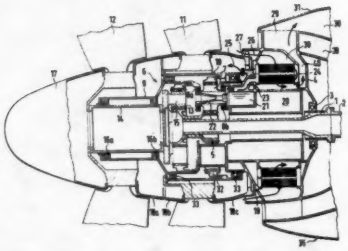
Helmut Geidel, Karlsfeld, and Alois Rohra, München, both of Fed. Rep. of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,042

Claims priority, application Fed. Rep. of Germany, May 6, 1987, 3714990

Int. Cl.[4] F02C *7/06*

U.S. Cl. 60—39.08 **14 Claims**



1. A propfan turbine engine comprising a gas turbine, a reduction gearing drivingly coupled to said gas turbine and spaced axially thereof, propfan rotor means drivingly connected to the reduction gearing, a lubricating system for said reduction gearing separate from a lubricating system of the gas turbine, said lubricating system for the reduction gearing including a tank for lubricant, a circuit for flow of lubricant between said tank and said reduction gearing, cooling means in said circuit for cooling the lubricant, and pump means for pumping the lubricant in said circuit, said lubricating system for the reduction gearing being in the form of an annular assembly arranged axially between said reduction gearing and said gas turbine, said gas turbine having an intake channel, said cooling means comprising an annular heat exchanger mounted radially inwards of said intake channel.

4,887,425

FUEL SPRAYBAR

John W. Vdoviak, Marblehead, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Mar. 18, 1988, Ser. No. 169,696

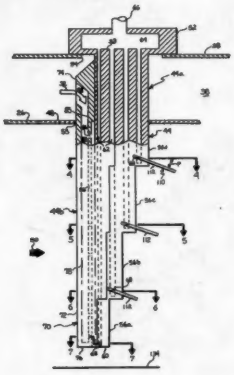
Int. Cl.[4] F02K *3/10*

U.S. Cl. 60—261 **31 Claims**

1. A fuel spraybar for a gas turbine engine comprising:

a base including a manifold for receiving fuel;

a plurality of fuel tubes extending from said base and including a trailing edge portion defined by side surfaces of said fuel tubes joined at a trailing edge, each fuel tube having a distal end, a proximate end fixedly joined to said base, a fuel passage disposed in fluid communication with said manifold, and a discharge port disposed in said tube distal end of said trailing edge portion in flow communication with said fuel passage;



means for cooling said fuel tubes including said distal ends, spaced from said fuel tubes for allowing independent thermal movement between said cooling means and said fuel tubes; and

said fuel tubes and said cooling means being positionable together in combustion gases in the gas turbine engine with said trailing edge portion being directly exposed to said combustion gases.

4,887,426

PROCESS AND DEVICE FOR OPERATING AN EXHAUST GAS BURNER

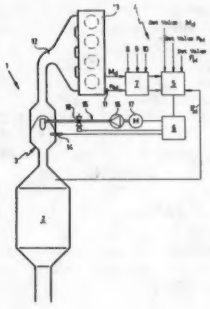
Dieter Goerlich, Emmering, Fed. Rep. of Germany, assignor to Webasto AG Fahrzeugtechnik, Stockdorf, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,293

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1987, 3728713

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—274 **7 Claims**



1. Process for operating an exhaust gas burner, particularly in the regeneration of soot filters or the like, in which the exhaust gas burner is turned on to start the regeneration or the like, comprising the steps of detecting of at least one condition

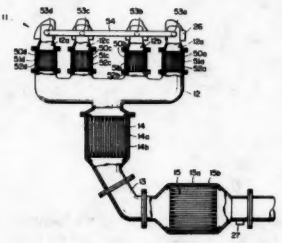
reflective of the oxygen content of exhaust gases supplied to the exhaust gas burner as a combustion air supply and initiating ignition of the burner only if the oxygen content in the exhaust gas reflected by the value of the condition detected represents a sufficiently high value to reliably enable ignition of the burner to be achieved.

4,887,427

EXHAUST PARTICLE REMOVING SYSTEM FOR AN ENGINE

Motohiro Shinzawa, and Nobukazu Kanesaki, both of Yokosuka, Japan, assignors to Nissan Motor Company, Limited, Japan

Continuation of Ser. No. 925,152, Oct. 27, 1986, abandoned.
This application Sep. 2, 1988, Ser. No. 227,034
Claims priority, application Japan, Oct. 28, 1985, 60-239562
Int. Cl.[4] F01N *3/02*
U.S. Cl. 60—286 **9 Claims**



1. An exhaust particle removing system for an engine comprising:

(a) first and second filter means disposed separately in an exhaust passage of the engine and connected in series with one another, the first filter residing at a location upstream of the second filter, the first filter being operative to trap an amount of exhaust particles greater than an amount of exhaust particles trapped by the second filter;

(b) means for sensing a pressure across the series combination of the first and second filter means; and

(c) means for rejuvenating the first and second filter means, when the sensed pressure reaches a reference pressure,

(d) said first filter comprising sub-filters respectively disposed in branches of an exhaust manifold of the engine.

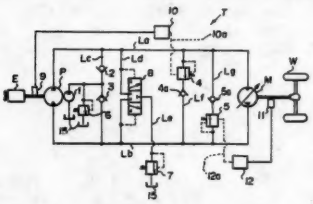
4,887,428

HYDRAULIC CONTROL DEVICE FOR A CONTINUOUSLY VARIABLE TRANSMISSION FOR MOTOR VEHICLES

Takashi Iino, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,901
Claims priority, application Japan, Jul. 31, 1987, 62-192347
Int. Cl.[4] F16D *31/02*
U.S. Cl. 60—468 **7 Claims**

1. A hydraulic control device for a continuously variable vehicle transmission having a closed hydraulic circuit disposed between a hydraulic pump and a hydraulic motor, with at least one of said hydraulic pump and said hydraulic motor being of the variable displacement type, said hydraulic pump being driven by an engine and said hydraulic motor being driven by hydraulic pressure from said hydraulic pump for driving road wheels, comprising, a pair of relief valves disposed between two oil passages of said closed hydraulic circuit and extending between said hydraulic pump and said hydraulic motor, each for relieving a pressure from one of said oil passages to the other oil passage, one of said relief valves relieving the pressure from the one of the oil passages which becomes higher in pressure when said continuously variable transmission is driven by driving forces from the engine to drive the road wheels and having a relief pressure setting controlled so as to increase as the speed of rotation of the engine increases, and the other relief valve relieving the pressure from the other oil



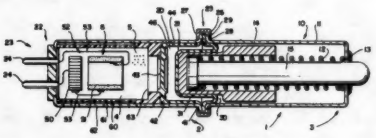
passage which becomes higher in pressure when said continuously variable transmission receives driving forces from the road wheels and having a relief pressure setting controlled so as to increase as the speed of the motor vehicle increases.

4,887,429

ELECTRO-THERMAL ACTUATOR

Joseph A. Birli, Sr., Richmond Heights, and Joseph A. Birli, Jr., South Euclid, both of Ohio, assignors to Design & Manufacturing Corporation, Willoughby, Ohio

Filed May 4, 1989, Ser. No. 347,188
Int. Cl.[4] F03G *7/06*
U.S. Cl. 60—527 **31 Claims**



1. An electro-thermal actuator comprising:

a housing;

a variable volume fluid chamber disposed in said housing formed in part by a diaphragm;

a piston assembly including a piston rod partially disposed in said housing on a side of said diaphragm opposite said variable volume fluid chamber, said piston assembly being movable by said diaphragm to force said piston rod out of said housing;

a boiler chamber disposed in said housing containing a thermally expandable working fluid;

heating means disposed in said boiler chamber for heating said working fluid in response to the flow of an electrical current through said heating means to move said diaphragm, thereby extending said piston rod from said housing; and

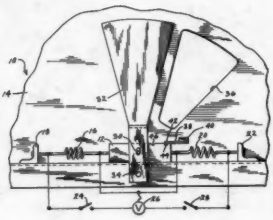
a flexible partition separating the variable volume fluid chamber and the boiler chamber for absorbing external forces applied to said piston rod, said partition having a normally closed opening therethrough consisting of a slit, said working fluid flowing between said variable volume fluid chamber and said boiler chamber when differential fluid pressures distend said partition and open the slit.

4,887,430

BISTABLE SME ACTUATOR WITH RETAINER

John W. Kroll, Greendale; Michael S. Baran, Wauwatosa, and James E. Mading, Sussex, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 21, 1988, Ser. No. 288,077
Int. Cl.[4] F03G 7/06
U.S. Cl. 60—527 19 Claims



1. A bistable shape memory effect, SME, mechanism comprising:

a housing;

an actuator in said housing for actuation along a travel stroke between first and second positions;

a first SME element in said housing and coupled to said actuator and moving said actuator to said first position upon heating of said first SME element above its transition temperature;

a second SME element in said housing and coupled to said actuator and moving said actuator to said second position upon heating of said second SME element above its transition temperature;

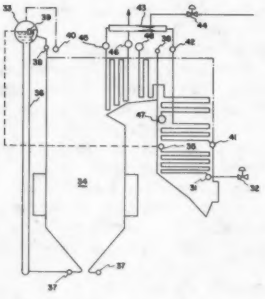
retaining means mechanically frictionally holding said actuator at the end of its travel stroke in one of said positions until actuated to the other position by heating of the respective SME element.

4,887,431

SUPERHEATER OUTLET STEAM TEMPERATURE CONTROL

William J. Peet, Cambridge, Canada, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Apr. 5, 1989, Ser. No. 333,482
Int. Cl.[4] F01K 13/02
U.S. Cl. 60—667 5 Claims



1. A method of controlling superheater outlet temperature in a steam generator having a superheater, a spray attemperator operatively connected to the superheater for receiving a feed-forward control for influencing the superheater outlet temperature, and a steam drum for discharging steam at a flow rate, comprising:

selecting a flow rate of steam required for a turbine to be operated by steam from the steam generator;

measuring the flow rate of steam from the steam drum;

taking the difference between the selected flow rate and the measured flow rate; and

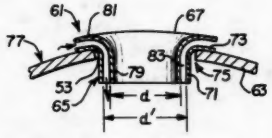
using the difference as the feed-forward control for the spray attemperator.

4,887,432

GAS TURBINE COMBUSTION CHAMBER WITH AIR SCOOPS

Stephen E. Mumford, Longwood, and Jan P. Smed, Winter Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 7, 1988, Ser. No. 255,577
Int. Cl.[4] F23R 3/08
U.S. Cl. 60—759 7 Claims



1. A gas turbine combustion chamber including means for admission of fuel to the upstream end thereof and discharge of hot gases from the downstream end thereof, and a combustion chamber wall, having an outer surface, with apertures therethrough, and air scoops provided through said apertures to direct air into the combustion chamber, the air scoops comprising:

an outer tubular member having an inner cylindrical portion and a first outer flanged portion, the flanged portion secured to the combustion chamber wall at said outer surface thereof;

an inner tubular member, having an inner cylindrical portion of an outer diameter less than the inner diameter of said inner cylindrical portion of said outer tubular member and coaxially positioned therein in spaced relationship to provide an annular air flow passage therebetween, the inner tubular member having a second outer flanged portion overlying the first outer flanged portion of said outer tubular member; and

at least one spacer member disposed between said first flanged portion and said second flanged portion, and secured thereto, adapted to allow cooling air flow between said flanges and through said annular air flow passage into said combustion chamber.

4,887,433

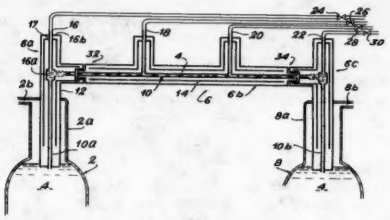
LIQUEFIED GAS TRANSFER LINE HAVING AT LEAST ONE BYPASS FOR THE VAPORS OF SAID GAS

Marcel Locatelli, Ismier, France, assignor to Commissariat A L'Energie Atomique, Paris, France

Filed Dec. 14, 1988, Ser. No. 284,364
Claims priority, application France, Dec. 22, 1987, 8717889
Int. Cl.[4] F17C 13/00
U.S. Cl. 62—50.7 9 Claims

1. Liquefied gas transfer line for the transfer of a liquefied gas between a storage vessel and a use vessel having a transfer tube with a first end connected to the storage vessel and a second end connectable to the use vessel, an outer tube surrounding the transfer tube and defining with the latter a volume, and a shield formed by an element placed between the internal volume between the transfer tube and the outer tube, the shield having at least one zone in contact with a heat ex-

changer in order to establish a heat exchange relationship between said shield and the liquefied gas vapours, characterized by at least one bypass having one end connected to the



transfer tube and a second end connected to a liquefied gas vapour recovery line, together with means for regulating the passage cross-section of said at least one bypass, which is in thermal contact with said shield.

4,887,434

APPARATUS FOR THE CRYOGENIC ENRICHMENT OF TRACE SUBSTANCES OF A GAS STREAM

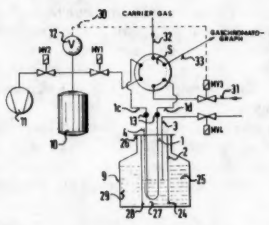
Gunter Pilwat, Niederzier, and Jochen Rudolph, Hürtgenwald, both of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich GmbH, Julich, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,367

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729374

Int. Cl.[4] B01D *8/00*

U.S. Cl. 62—55.5 **9 Claims**



9. A process for the cryogenic concentration of a trace substance in a gas stream, comprising the steps of:

substantially filling a cooling vessel having an upwardly open mouth with a liquid cryogenic coolant;

introducing into said vessel at least one pipe having at least one U-shaped bend extending into said vessel and having pipe sections connected with said bend extending out of said mouth and connectable in a flow path for said gas stream whereby said trace substance is cryogenically retained in said bend at least in part by adsorption as said gas stream traverses said pipe;

defining in said vessel a chamber surrounding said U-bend and opening at location at a lower part of said chamber into said vessel;

unblocking a vent tube opening downwardly into said chamber above said location, extending out of said vessel above said mouth and provided externally of said vessel with valve means for opening and closing said vent tube to permit a level of said cryogenic coolant to rise in said chamber;

passing said gas stream through said pipe to collect said trace substance in said U-bend; and

thereafter heating the trace substance retained in said U-bend to drive the trace substance in concentrated form from said pipe.

4,887,435

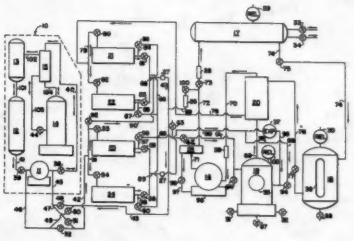
REFRIGERATION CLEANING AND FLUSHING SYSTEM

David W. Anderson, Jr., 214 Sandra Rd., Jacksonville, Fla. 32211

Filed Jun. 23, 1988, Ser. No. 210,087

Int. Cl.[4] F25B *47/00*

U.S. Cl. 62—85 **28 Claims**



1. A process for cleaning and flushing an installed refrigeration system, including an installed compressor and a vaporizable liquid refrigerant used in the system; the process comprising:

(a) disconnecting the refrigerant inlet and exit lines which join the installed compressor to the installed refrigeration system;

(b) connecting the inlet and exit lines of the installed refrigeration system to corresponding input and output lines of a portable refrigeration cleaning and flushing system including a portable compressor, a condenser, a receiver, an evaporator the same refrigerant as that of the installed system to be rejuvenated; and means for cleaning said refrigerant;

(c) operating said portable refrigeration system to flush said refrigerant through the combined installed system and portable system to clean said installed system and the refrigerant passing therebetween;

(d) returning to said installed refrigeration system a suitable amount of cleaned refrigerant for normal operation thereof;

(e) reconnecting the installed compressor into said rejuvenated installed refrigeration system by reconnecting the inlet and exit lines of the installed compressor to said installed refrigeration system.

4,887,436

DEFROSTING SYSTEM FOR A HEAT EXCHANGER

Toshihiko Enomoto; Yasuo Nakashima; Takashi Watanabe; Takao Komai, and Tatsuya Mochizuki, all of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1988, Ser. No. 265,514

Claims priority, application Japan, Nov. 18, 1987, 62-291398

Int. Cl.[4] F25D *21/06*

U.S. Cl. 62—155 **1 Claim**

1. A defrosting system for a heat exchanger comprising:

a temperature detector adapted to be arranged in close proximity to a heat exchanger;

a temperature memory for storing temperature data detected by the temperature detector;

a first timer for counting a defrosting prohibitive time;

a second timer for counting the time required to complete the defrosting operation;

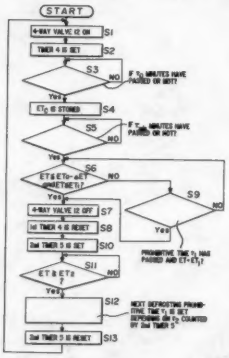
a switching means for switching the flowing direction of a refrigerant to the heat exchanger; and

a central processing unit for controlling the temperature

memory, the first and second timers, and the switching means, and further carrying out arithmetic manipulations;

wherein the central processing unit sets the next prohibitive time depending on the time counted by the second timer; and

when a second temperature which is detected by the temperature detector after normal operation requested by a user has restarted and after a predetermined minimum defrosting prohibitive time has passed, drops by a predetermined difference in temperature from a first temperature which is detected by the temperature detector after the normal operation has restarted and after a predetermined time has passed, and when the second temperature is a predetermined temperature or below; the central processing unit carries out the defrosting operation even if the prohibitive time has not passed.



4,887,437

INTEGRAL FALSE CEILING FOR REFRIGERATED VEHICLES

Gary Fenton, Stoughton, Wis., and Tom Huddle, Charleston, Ill., assignors to Trailmobile Inc., Chicago, Ill.

Filed Mar. 18, 1988, Ser. No. 169,931
Int. Cl.[4] F25D *17/04*
U.S. Cl. 62—186 **17 Claims**

1. Air conditioning means and duct means for a trailer having divided temperature controlled first and second thermally separate compartments comprising at the first compartment an air conditioner and substantially enclosed overhead duct directly connected with the air conditioner,

said duct having a bottom wall and first and second portions extending respectively into both compartments and having an opening in the second compartment;

flow restricting means in the first portion of the duct in the first compartment,

temperature control means in one compartment,

said flow restricting means in the duct connecting with the temperature control means and openable and closable thereby in response to temperature changes in the compartment;

bleed air means in the duct to permit exiting of air from the duct into the first compartment, and

said bleed air means being adjustable to incrementally allow flow of temperature conditioned air from the duct into the first compartment;

said bleed air means comprising a valve means in the bottom wall of the duct;

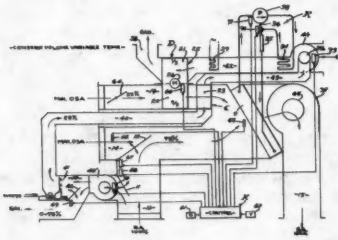
said valve means including a sliding member mechanically adjustable to increase and decrease the opening for venting temperature controlled air into the first compartment.

4,887,438

DESICCANT ASSISTED AIR CONDITIONER

Milton Meckler, 16348 Tupper St., Sepulveda, Calif. 92343

Filed Feb. 27, 1989, Ser. No. 315,592
Int. Cl.[4] F25D *23/00*
U.S. Cl. 62—271 **19 Claims**



1. A desiccant assisted air conditioning system for delivering dehumidified refrigerated supply air into a conditioned space and with return therefrom divided between recirculation air and exhaust - relief air employed to remove heat resulting from dehumification and employing waste heat from refrigeration for desiccant regeneration, and including;

a first outside air inlet duct inducting minimum outside air through a dehumidifying section of a desiccant dehumidifying means,

a second outside air inlet duct inducting maximum outside air and connected into said first duct for mixing with the air conducted through the dehumidifier means and delivering mixed air through a cooling coil of a refrigeration means,

a blower means for circulating the mixed air through the cooling coil and through a third supply air duct opening into the conditioned space,

the refrigeration means being comprised of a compressor means delivering liquid refrigerant through a condenser coil for discharge of waste heat and through means for expansion in said cooling coil and return to the compressor means as a gas,

a fourth return air duct from the conditioned space and connected into said second outside air inlet duct downstream from a damper and control means therein to regulate volume inlet of maximum outside air and volume recirculation of return air,

a fifth relief air duct from the conditioned space and conducting conditioned space air through an evaporative air cooling means and discharging to exhaust through a heat exchanger means passing and cooling heated air from the dehumidifying section of the dehumidifying means upstream of said mixing with air delivery through the cooling coil,

a sixth outside air duct and blower means delivering air through the condenser coil of the refrigeration means for the absorption of waste heat and conducting the same through a desiccant regenerating section of the dehumidifying means and to exhaust,

and control means coordinating the damper and control

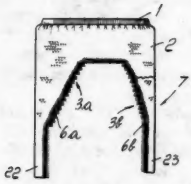
means and operation of the dehumidifying means and refrigeration means.

4,887,439

PROCESS FOR MANUFACTURING A SEMI-FINISHED ITEM FOR THE PRODUCTION OF BRIEFS WITH A CIRCULAR KNITTING MACHINE

Riccardo Tenconi, Varese, Italy, assignor to MEC-MOR S.p.A., Induno Olona, Italy

Filed May 6, 1988, Ser. No. 190,964
Claims priority, application Italy, May 18, 1987, 20573 A/87
Int. Cl.[4] A41B 9/00
U.S. Cl. 66—51 4 Claims



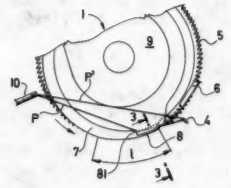
1. Process for manufacturing a semi-finished item for the production of briefs with a circular knitting machine for knitwear, stockings and the like, comprising: a first step of formation of an elastic border intended to girdle the user proximate to the hips, a second step of formation of a tubular body of knitting starting from said elastic border for a present number of complete rows, a third step in which a first group of needles and a second group of needles of the machine, operating on mutually angularly spaced portions of said tubular body, are excluded from working to define, on the lateral surface of said tubular body, a pair of missing portions constituting the leg apertures of the briefs, said first group of needles and said second group of needles excluded from working gradually increasing in number for a widening of said missing portions and a fourth step of disengagement of the needles from the loops of said tubular body, wherein in said second step, in the knitting of the last complete rows of said tubular body, a preset number of needles, operating in said mutually angularly spaced regions, is fed with yarn and with elastic thread and wherein, in said third step, a preset number of needles, proximate to said first group and to said second group of needles, is fed with yarn and with elastic thread for the formation of an elastic border around said leg apertures.

4,887,440

THREAD CUTTING DEVICE

Jan Jelínek, Irebic, Czechoslovakia, assignor to ELITEX koncern textilního strojirenství, Liberec, Czechoslovakia

Filed Sep. 28, 1988, Ser. No. 252,824
Claims priority, application Czechoslovakia, Sep. 28, 1987, 6922-87
Int. Cl.[4] D04B 15/61
U.S. Cl. 66—145 S 3 Claims



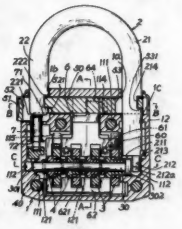
1. An improved thread cutting device in a circular knitting machine having a plurality of cylinder needles for the production of hosiery goods, comprising a stationary cutting blade arranged on the dial, feed means for feeding thread, a circular cutting saw and a shaped element mounted above it so that on a part of the arc in front of the stationary cutting blade with respect to the rotary direction of the machine the shaped element covers a portion of the teeth of the circular cutting saw, the improvement comprising that above a part of the shaped element in front of the stationary cutting blade with respect to the rotary direction of the machine in the path of threads being fed by said thread feed means a thread is being drawn by one of said cylinder needles, there is operatively mounted a projection for lengthening said thread between said needle and said circular cutting saw.

4,887,441

QUICKLY OPENABLE COMBINATION PADLOCK OF PUSH-BUTTON TYPE

Chong-Kuan Ling, P.O. Box 53-58, Taipei, Taiwan

Filed Jun. 20, 1989, Ser. No. 368,555
Int. Cl.[4] E05B 37/06
U.S. Cl. 70—25 8 Claims



1. A combination padlock comprising:

a casing combinably formed by two covers; a shackle generally formed as an U shape having a short leg and a long leg, each said leg formed with a locking recess therein;

a plurality of dials of combination numerals rotatably mounted on a shaft formed in said casing;

a plurality of sleeves each said sleeve engageable in each said dial having a divergent notch formed in said sleeve;

a push-button slide having an elongate member horizontally slidably held in said casing having two vertical shackle holes formed therethrough for passing two said legs of said shackle, each said shackle hole being recessed inwardly to form a locking extension engageable with each locking recess formed in either said leg of said shackle, said slide having a push button normally protruding outwardly beyond said casing and having a recess formed on a side portion of said elongate member;

a seesaw controller having a pair of side arms pivotally secured in said cover, a lower plate having a plurality of tapered extensions formed thereon each said tapered extension operatively engageable with each said divergent notch of said sleeve when opening said padlock, and an upper plate positioned above said lower plate operatively engageable with said recess of said slide when locking said padlock; and

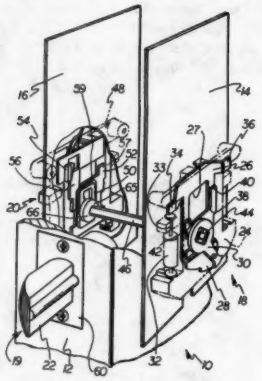
a shackle ejector having a plunger restored by a restoring spring and retained on a wall inside said casing resiliently urging said short leg upwardly beyond said casing when opening said padlock, whereby upon a thrusting of the tapered extension of said lower plate of said seesaw controller by a flange of said sleeve, said upper plate of said controller is biased to engage said recess of said slide to retard the depression of said push button of said slide for locking said padlock.

4,887,442

ELECTRONIC LOCKSET ASSEMBLY AND CONTROL

Gary E. Lavelle, Avon, Conn., assignor to Emhart Industries, Inc., Towson, Md.

Filed Sep. 27, 1988, Ser. No. 250,299
Int. Cl.[4] E05B 55/00
U.S. Cl. 70—143 9 Claims



1. A control for an electronic lockset of the type having a bolt movable between a bolt fully extended position when a door is closed and a bolt partially extended position when the door is open, said control comprising:

actuator means for moving the bolt between its fully extended and partially extended positions;

switch means responsive to the position of the bolt and having a first position when the bolt is fully extended and a second position when the bolt is partially extended;

means for selectively locking the bolt when the bolt is in its fully extended position; and

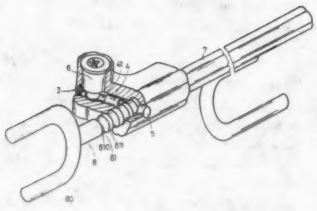
processing means responsive to the switch means for preventing the selective locking means from locking said lockset when said bolt is in its partially extended position.

4,887,443

AUTOMOBILE STEERING LOCK

Ching-Rong Wang, No.27,Alley 74,Lane 313,Wen-Hsien Road, Tainan City, Taiwan

Filed Apr. 14, 1989, Ser. No. 338,216
Int. Cl.[4] B60R 25/02
U.S. Cl. 70—209 1 Claim



1. An antitheft device for attachment to a steering wheel of an automobile comprising:

an elongated tubular member having an inner end, an outer end and an elongated passageway extending along its axis therethrough, said tubular member having a first U-shaped hook portion extending therefrom with the closed end of the U-shaped portion generally adjacent to but slightly spaced from the inner end of said tubular member and the open end of said U-shaped portion facing said outer end of said tubular but substantially removed therefrom, said U-shaped hook portion of said tubular member further defined by a bottom leg portion generally extending in the direction of said tubular member's axis and terminating at a distance substantially removed from said outer end of said tubular member, said U-shaped hook portion of said tubular member adapted to engage said wheel from the inside thereof with said outer end of said tubular member extending a substantial distance beyond the periphery of said wheel;

a rod member having an elongated rod adapted to extend in a telescopic manner within said passageway of said tubular member and a second U-shaped hook secured to one end of the rod, having an opening facing opposite to the first hook and adapted to engage said wheel from the inside thereof;

a plurality of spaced annular grooves each of which consisting of a vertical side wall relatively close to the second U-shaped hook and a convex or slope side wall relatively far from the second U-shaped hook, circumferentially formed in a portion of the rod;

a housing means firmly formed around an end portion of the tubular member with the elongated passageway of the tubular member extending therethrough;

a lock having a locking member extending downwardly and having at least one side of longer dimension and one side of shorter dimension;

means offset with respect to the axis of the tubular member in the housing means for firmly receiving the lock;

a transverse passageway transversely formed in the housing means and interconnecting bore means and the passageway in the tubular means in the housing means;

rod-like bearing means slidably accommodated in the transverse passageway under the lock and having a tenon member attached to an end thereof and arranged to be actuated between a locking position with the tenon member protruding into an annular groove in the rod and an unlocking position with the tenon member withdrawn from annular groove and opposed vertical side walls between the locking member being controlled to position the tenon member in locking or unlocking position through the rod-like bearing member by means of the locking member; and

a spring member disposed in the transverse passageway and biasing the rod-like bearing means towards the passageway in the tubular member.

4,887,444

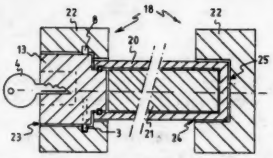
LOCKING MEANS, AND MORE PARTICULARLY A LOCK FOR A BICYCLE

Grada de Brouwer-Elzenbroek; Franciscus J. G. H. de Brouwer; de Brouwer, René E. R., all of Arnhem, and Monique Y. M. de Brouwer, Giesbeek, all of Netherlands, assignors to Karsten Metaal B.V., Veendam, Netherlands

Filed Jul. 25, 1988, Ser. No. 223,496
Claims priority, application Netherlands, Jul. 24, 1987, 8701751
Int. Cl.[4] E05B 71/00
U.S. Cl. 70—233 4 Claims

1. A locking device particularly for vehicles comprising a pair of members each having a bore therein and said bores being aligned, one of said bores having an annular groove therein, a cylinder lock having a catch movable at right angles to the longitudinal axis of said cylinder lock and said catch being receivable in said annular groove such that said cylinder lock is rotatable in said one bore, a locking bar element rotatably mounted on said cylinder lock such that the longitudinal axes of said cylinder lock and said locking bar element are aligned and both said cylinder lock and said locking bar ele-

ment are rotatable relative to each other and independently of each other around the aligned longitudinal axes, said locking



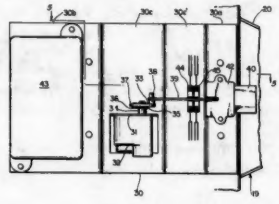
bar element having an end thereof received in the other of said bores.

4,887,445

ELECTRONIC LOCK FOR HOTEL ROOM SAFES AND THE LIKE

Scott M. Beatty, Nicholasville, Ky., assignor to Sargent & Greenleaf, Inc., Nicholasville, Ky.

Filed May 30, 1989, Ser. No. 359,043
Int. Cl.[4] E05B *49/00*
U.S. Cl. 70—278 **18 Claims**



1. An electronic lock controlled safe for hotel rooms and the like comprising a box-like safe defining a security enclosure having side, rear, top and bottom walls and a safe door and door frame for a front wall therefor, an electronic lock mounted on said door including a forwardly exposed keyboard and display means including a keypad having plural finger-actuated keys with associated numerals and legends and a display window and associated electrically activated alpha-numeric display strip located adjacent the keypad for displaying messages through the display window to an operator; a lock mechanism on the door including a bolt movable between projected and retracted positions respectively for locking and unlocking the door, an electric motor and drive wheel means driven thereby including a slip clutch mechanism, a movable link member coupled to the slip clutch mechanism and the bolt, photoelectric light sensor means positioned adjacent the link member providing sensor beam paths selectively intercepted by portions, the link member for sensing predetermined positions of the link member for producing sensor signals, and electronic circuit means responsive to signals from the keypad keys and said sensor signals for activating said display strip to display predetermined messages and for activating said electric motor to move said bolt to said projected and retracted positions.

4,887,446

SYSTEM FOR TRANSFERRING WORKPIECES THROUGH A SERIES OF WORK STATIONS

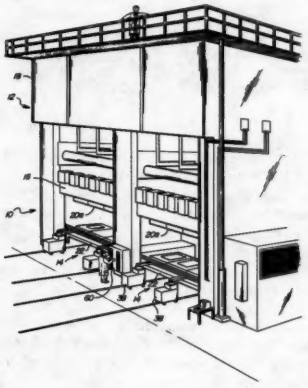
John H. Maher, G-2483 Claywood Dr., Burton, Mich. 48519

Filed Jun. 23, 1988, Ser. No. 210,368
Int. Cl.[4] B21J *13/08*
U.S. Cl. 72—22 **18 Claims**

1. For use in conjunction with an article forming press which includes a ram having an upper die associated therewith adapted to be driven along a path of travel in a Z-axis and engagable with a lower die supported by a bolster for forming a workpiece inserted therebetween, a system for transferring work stations aligned linearly along an X axis perpendicular to the Z axis, to perform a predetermined sequence of operations on the workpieces, said system comprising:

a transfer rail extending longitudinally in spaced and parallel relation to the X axis and having a finger operator rail mounted thereupon for movement with respect thereto in a direction parallel to the X-axis;

a plurality of workpiece gripping finger operators mounted on the finger operator rail at equally spaced locations thereon corresponding to the spacing of the work stations, said finger operators extending laterally in a Y axis, perpendicular to the X axis and Z axis and each terminating



in a free end having a workpiece engaging section adapted to engage the workpieces and transfer them between adjacent work stations;

individually controllable means for imparting reciprocal motion, along the X-axis, to the finger operator rail for a distance equal to the spacing between adjacent work stations; and

at least one individually controllable, modular actuator unit, the entirety of said actuator unit supported independently from the transfer rail and disposed at a location displaced laterally along the Y axis from the ram, dies, bolster and path of travel of the ram, said actuator unit having an arm which extends therefrom in the Y direction and which is operative to move the transfer rail along both the Y and Z axes.

4,887,447

REBAR CUTTING AND BENDING MACHINE

Len Schweitzer, 3272 Susileen Dr., Reno, Nev. 89509

Continuation-in-part of Ser. No. 59,703, Jun. 8, 1987, Pat. No. 4,798,078. This application Jun. 17, 1988, Ser. No. 208,351
Int. Cl.[4] B21D *28/00*
U.S. Cl. 72—332 **30 Claims**

15. An apparatus for cutting bar adapted to be attached to a bar bending machine, the bar bending machine having an elongated base defining a linear guideway which is open at an end of the base, a slide reciprocally movably disposed in the guideway, and means for reciprocating the slide in the guideway so that in a first initial position an end of the slide is withdrawn into the guideway and in a second terminal position the end of the slide protrudes from the open guideway, the apparatus comprising:

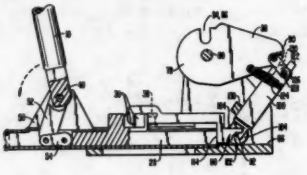
first and second axially aligned cutting discs carried on a

shaft, the shaft being spaced from the slide, the second disc being non-pivotally mounted on the shaft, each disc having at least one axially oriented groove adapted to be aligned with a groove on the other disc, the first disc being pivotal on the shaft through an arc sufficient to substantially offset the grooves:

an extension projecting generally radially from the first disc;

means in engagement with the slide and the extension for pivotally moving the first disc relative to the second disc in a first direction over less than the arc when the slide is initially moved toward the terminal position;

means for permitting movement of the slide toward the



initial position without causing a corresponding movement of the extension and the first disc;

means for additionally pivotally moving the first disc in the first direction in response to at least a second movement of the slide towards the terminal position to effect pivotal movement of the first disc over the arc;

whereby a bar placed into the aligned grooves is cut when the first disc has been moved over the arc with a plurality of reciprocating slide movements; and

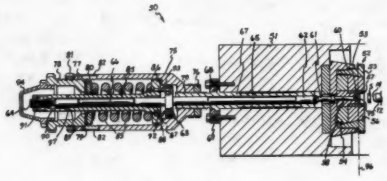
return means operatively coupled with the extension and the slide for thereafter pivotally returning the first disc over the arc and thereby realigning the groovcs when the slide is moved towards the initial position.

4,887,448

KNOCKOUT PIN APPARATUS

J. Peter E. Kooi, and James W. Myers, Jr., both of Carrollton, Ky., assignors to Teledyne Industries Inc., Chester, Pa.

Filed Jun. 21, 1988, Ser. No. 209,554
Int. Cl.[4] B21J *13/14*
U.S. Cl. 72—344 **5 Claims**



1. An improved knockout pin apparatus for an impact extrusion press and including:

a knockout pin operatively associated with a push rod,

a first sleeve mounted on said press and having a threaded rear end, said push rod extending therethrough,

a rotatable housing threaded on said first sleeve,

a shoulder defined in said housing,

a tension sleeve in said housing having a radial flange,

a spring means about said tension sleeve and supported at one end on said flange, said flange supported by said shoulder,

a spring adjusting nut mounted in said housing at another end of said spring for compressing said spring toward said flange and shoulder and thereby adjusting preload of said spring thereagainst, and

said flange operably connected to said push rod,

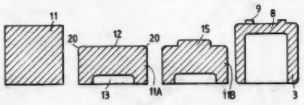
wherein said spring preload is adjustable independently of the position of said push rod and knockout pin.

4,887,449

METHOD FOR FORMING A PISTON HAVING A PEG

Tamotsu Kanai, Kooriyama, and Katsunori Hayashi, Fukushima, both of Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 238,704
Claims priority, application Japan, Sep. 4, 1987, 62-220240
Int. Cl.[4] B21K *01/18*
U.S. Cl. 72—356 **7 Claims**



1. A method for forming a piston having a peg projecting from and disposed on a top surface of an end portion for use in a brake apparatus of a fluid pressure type, comprising the steps of:

preparing a metallic material having a predetermined measure,

forming a first preform having a flat top surface and a bottom surface configured with a central recessed portion,

forming a second preform from said first preform, said second preform having a portion projecting from said flat top surface; and

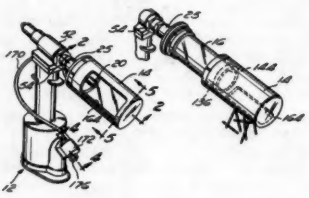
forming the projecting peg from a portion of said projecting portion on said flat top surface.

4,887,450

FASTENER STEM COLLECTION APPARATUS AND METHOD

Robert L. Gast, Tustin, and Lyle V. Willits, Costa Mesa, both of Calif., assignors to Textron, Inc., Providence, R.I.

Filed Mar. 31, 1988, Ser. No. 175,523
Int. Cl.[4] B21D *31/00*
U.S. Cl. 72—391 **13 Claims**



1. A stem collection apparatus for a power operated fastening device having means for separating stems from fasteners, comprising:

a housing selectively attachable to the fastening device;

an ejection tube slidably disposed within said housing having a central bore therethrough leading rearward from the fastening device through which the stems can pass;

means for urging said ejection tube forward against the fastening device so that the ejection tube central bore forms therewith a continuous, unobstructed passage through which stems may pass;

means for introducing pressurized fluid into the central bore so that the pressurized fluid flows away from the fastening device thereby urging the stem from the fastening device rearward through the central bore;

an inner collector tube for collecting the stems fixed to said housing rearward of said fastening device forming a first cavity therein in communication with said central bore, said inner collector tube having a tubular side wall throughout its length which is constructed to prevent the passage of said stems, through said side wall, and said collector tube having a stem outlet aperture at its rear end distal said fastening device; and

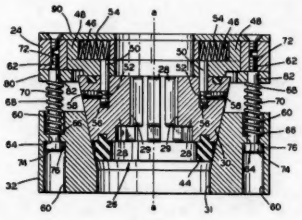
an outer canister disposed about said inner collector tube having a window in the side thereof between the forward and rear end, a closed rear end distal the fastening device, said canister including holding structure which is selectively engageable in a forward position of said canister wherein said closed end covers said aperture to capture said stems and to prevent relative linear movement with respect to the inner collector tube or disengageable to allow moving the outer canister rearwardly away from said inner collector tube so that the rearwardly displaced outer canister forms a second cavity therein rearward of the first cavity and connected thereto by the inner collector tube rear aperture, thereby allowing discharge of stems from the cavity within the inner collector tube, through the second cavity and through the outer canister window.

4,887,451

SELF-RETRACTING MODULAR COLLET ASSEMBLY

Steven R. Hoff, New Haven, Ind., and Larry L. Zuber, Antwerp, Ohio, assignors to Dana Corporation, Toledo, Ohio

Filed Aug. 10, 1988, Ser. No. 230,629
Int. Cl.[4] B21D *41/04*
U.S. Cl. 72—402 **12 Claims**



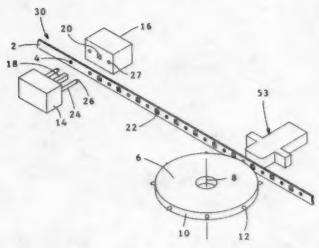
11. In a device adapted for crimping a metallic fitting to one end of an elastomeric hose, said device including a base ring having a frustoconically tapered interior bore defining an axis, a plurality of mating collet assemblies, each of said collet assemblies comprising at least one die segment supported in an elastomeric cage, each of said segments being circumferentially spaced apart but contractible together in said cages, said crimping device further including a ram pressure ring movable toward said base ring and adapted for selectively urging said collet assemblies axially against said interior bore of said base, thereby radially translating said die segments inwardly toward said axis; an improvement comprising means for attaching said collet assemblies to said pressure ring including means for allowing radial movement of said collet assemblies with respect to said pressure ring while maintaining axial alignment of said collet assemblies during crimping, wherein said means for attaching said collet assemblies includes a spring for biasing said collet assemblies radially outwardly.

4,887,452

SPROCKET-TYPE STRIP FEED

Johannes C. W. Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 15, 1988, Ser. No. 284,516
Int. Cl.[4] B21D *28/04*
U.S. Cl. 72—420 **7 Claims**



1. A machine, such as a stamping and forming machine, having an operating zone and having a feed sprocket adjacent to the operating zone for feeding strip material intermittently through the operating zone, sprocket actuating means for intermittently rotating the feed sprocket, the strip material having pilot holes therein at uniformly spaced intervals, the operating zone having pilot pins therein which are moved into the pilot holes in the portion of the strip which is in the operating zone during non-feeding intervals, the sprocket having sprocket teeth on the periphery thereof which are dimensioned to enter the pilot holes and which are spaced apart by the same amount as the pilot holes, the strip and the sprocket wheel having a tangency location at which the strip in tangent to the sprocket, the machine being characterized in that:

the sprocket teeth are generally conical and have a base diameter which is substantially equal to, and less than, the diameter of the pilot holes,

the sprocket actuating means is timed to locate one sprocket tooth at the tangency location during non-feeding intervals with the one tooth extending into a pilot hole,

during non-feeding intervals, the sprocket teeth on each side of the one tooth are not in engagement with the strip, and

retaining means are provided for retaining the strip against the sprocket wheel at the tangency location whereby, with the one sprocket tooth extending into the pilot hole, the retaining means permitting limited radial movement of the strip on the one tooth radially away from the periphery of the sprocket wheel upon movement of the pilot pins into the strip material during non-feeding intervals, the strip can be moved along its length by the pilot pins with accompanying movement of the strip laterally of its plane and radially away from the periphery of the feed sprocket.

4,887,453

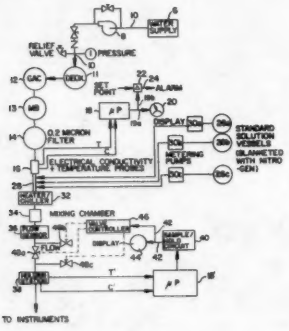
METHOD AND SYSTEM FOR ON-LINE CALIBRATION AND VALIDATION OF PROCESS INSTRUMENTATION

Hudson R. Carter, Alliance, and Eugene T. Upperman, North Canton, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Jun. 2, 1988, Ser. No. 202,090
Int. Cl.[4] G01N *27/26*
U.S. Cl. 73—1 R **6 Claims**

1. A system for producing a validating solution for a process instrument measuring the analyte content of a water solution, comprising:

a water supply;
means for producing pure water fluidly coupled to said water supply, said pure water reproducing means having an outlet for the pure water;
a temperature measuring device situated in the pure water at the outlet to measure the temperature thereof and establish a signal indicative thereof;
an electrical conductivity measuring device situated in the pure water at the outlet near said temperature measuring device to measure the conductivity thereof and establish a signal indicative thereof;



a microprocessor connected to said temperature measuring device and to said conductivity measuring device to receive the signals therefrom, and being programmed to use these signals to solve a water purity equation and establish an output signal indicative thereof;
means for maintaining water purity responsive to changes in the output signal of said microprocessor; and
means for adding analytes to the pure water to provide a solution suitable for validating the measuring instrument.

4,887,454

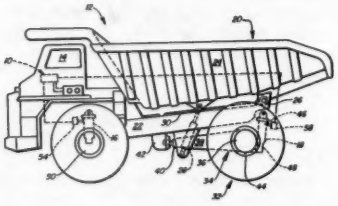
METHOD FOR MONITORING A WORK VEHICLE SUSPENSION

Christos T. Kyrtsos; F. Paul Lutgen, both of Peoria, and Adam J. Gudat, Edelstein, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Division of Ser. No. 137,793, Mar. 2, 1988, Pat. No. 4,845,975, which is a division of Ser. No. 935,870, Nov. 28, 1986, Pat. No. 4,774,239. This application Jan. 9, 1989, Ser. No. 294,441

Int. Cl.[4] G01M *17/04*

U.S. Cl. 73—11 8 Claims



1. A method for detecting a collapsed strut of a moving work vehicle having a plurality of left and right strut mounted wheels, comprising:
periodically sensing the internal pressure of selected struts;
delivering a plurality of strut pressure signals each having a magnitude correlative to the internal pressure of each respective strut;
storing a first set of the periodically delivered strut pressure signals;
computing the difference in magnitude between said first set and a second set of the periodically delivered strut pressure signals for each strut;
counting the number of times the difference in magnitude exceeds predetermined amounts for each strut; and
delivering a signal indicative of a collapsed strut in response to a ratio of said counts exceeding a predetermined value after a predetermined time period.

4,887,455

GAS SENSOR

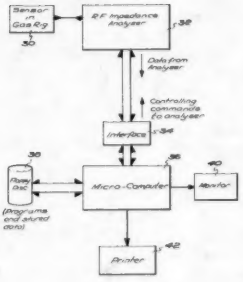
Peter A. Payne; Jon G. Bartlett, both of Manchester, and Natalie K. Harris, Cornwall, all of England, assignors to Cogent Limited, London, England

Filed Apr. 5, 1988, Ser. No. 177,671

Claims priority, application United Kingdom, Apr. 6, 1987, 8708201

Int. Cl.[4] G01N *27/02*

U.S. Cl. 73—27 R 6 Claims



1. A gas sensor for detecting the presence of a gas, the sensor comprising:
a layer of semiconducting organic polymer;
means for applying an alternating electric signal to the layer;
means for varying the frequency of said signal; and
means for detecting the variation in impedance characteristics of said layer in the presence of said gas.

4,887,456

KNOCK DETECTION SYSTEM

Kevin Cockerham, Sutton Coldfield, and Simon W. Packwood, Birmingham, both of England, assignors to Lucas Industries plc, Birmingham, England

Filed Nov. 24, 1987, Ser. No. 124,607

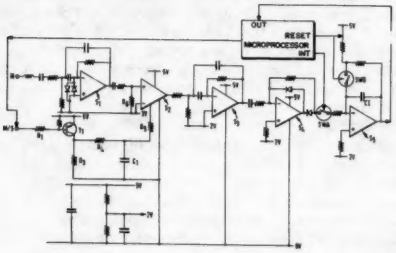
Claims priority, application United Kingdom, Nov. 27, 1986, 8628338

Int. Cl.[4] G01L *23/22*

U.S. Cl. 73—35 8 Claims

7. A knock detection system for an internal combustion engine, comprising:
an input for receiving a signal from a vibration-sensing transducer;
an amplifying means to which said input is connected; and
rectifying and integrating means connected to the output of said amplifying means, said amplifying means comprising a variable gain amplifier provided with feedback means for controlling the gain of the variable gain amplifier in dependence upon variations in the output level of the rectifying and integrating means, in which said feedback means comprises means to provide a train of pulses of

variable mark/space ratio for determining the amplifier gain, and a digital-to-analogue converter receiving said



pulse train and having an output connected to the amplifier to control its gain

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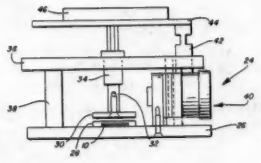
4,887,457

FIXTURE AND METHOD OF TESTING FOR SOFT PACKAGE LEAK INTEGRITY

Grant V. Humbarger, Mishawaka, Ind., assignor to Miles Inc., Elkhart, Ind.

Filed Nov. 28, 1988, Ser. No. 276,922
Int. Cl.[4] G01M *3/36*
U.S. Cl. 73—49.3 **7 Claims**



1. A method of testing for leaks in soft packages fabricated, at least in part, of a material having memory comprising the steps of:

placing one or more soft packages in a chamber;

placing a counterweight force on said soft packages tending to hold said soft packages in their original configuration;

creating a vacuum of approximately 900 u in said chamber; and

measuring any dimensional changes of said soft packages.

4,887,458

HEMATOCRIT READER APPARATUS AND METHOD

Charles D. Baker, Sandy; Owen D. Brimhall, West Valley City, and James E. Messinger, Salt Lake City, all of Utah, assignors to Separation Techology, Inc., Salt Lake City, Utah

Filed Sep. 21, 1988, Ser. No. 247,246
Int. Cl.[4] G01N *33/48, 1/00*
U.S. Cl. 73—61.1 R **5 Claims**

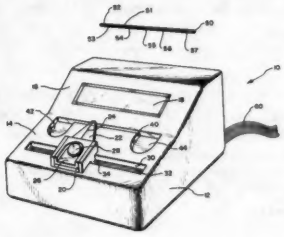
1. A hematocrit reader for providing an indication of the ratio of packed cell volume relative to the plasma volume in a blood sample in a microhematocrit capillary tube wherein the blood sample has undergone centrifugation to produce a separation between the packed cell volume and the plasma comprising:

a channel for holding the microhematocrit capillary tube;

moveable marker means for movement along the length of the microhematocrit capillary tube, said moveable marker having a finger detent for moving said moveable marker;

cursor means mounted on said moveable marker for collimating the marker with selected positions on the microhematocrit capillary tube;

data entry means comprising a data entry switch in said finger detent for entering data at specific locations of the marker means as determined by said cursor means;



calibration means for coordinating the position of the marker means relative to the data entry points entered by the data entry means;

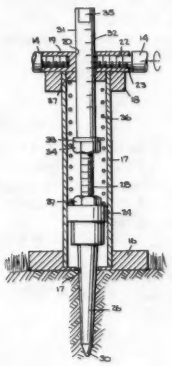
comparison means for comprising the distance the marker is moved between data entry points, the comparison means providing a hematocrit reading for the blood sample in the microhematocrit capillary tube.

4,887,459

TURF GAUGE FOR MEASURING THE HARDNESS OF A GOLD GREEN

Frank Thomas, Chester, N.J., assignor to U.S. Golf Association, Far Hills, N.J.

Filed Jul. 6, 1988, Ser. No. 215,547
Int. Cl.[4] G01N *3/42*
U.S. Cl. 73—81 **12 Claims**



1. A turf gauge for measuring the hardness of a golf green comprising

a housing having a flat base at one end with a bore extending therethrough;

a probe assembly movably mounted within said housing for movement between an extended position and a retracted position, said assembly including a probe extending through said bore in said base in said extended position for penetrating into the golf green;

a spring within said housing biasing said probe assembly into said extended position under a predetermined force;

a member adjustably secured to said probe assembly and extending out of said housing at an end opposite said

probe, said member having a scale thereon with indicia to cooperate with an upper end of said housing to indicate the extent of projection of said probe from said housing into the green; and

a locking member on said housing for locking said member relative to said housing to fix said probe relative to said housing to obtain a measurement of the depth of penetration of said probe into the green.

4,887,460

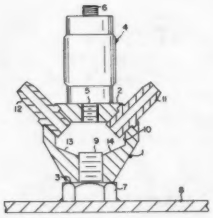
APPARATUS FOR MEASURING THE VIBRATIONAL CHARACTERISTICS OF A MUFFLER

Mostafa M. Khosropour, Madison, Wis., assignor to Nelson Industries, Inc., Stoughton, Wis.

Filed Jan. 19, 1989, Ser. No. 298,964

Int. Cl.[4] G01M *19/00*

U.S. Cl. 73—118.1 **12 Claims**



1. A device for measuring the vibrational characteristics of a muffler, comprising a metal adapter having an internal passage, connecting means for securing the adapter to the outer surface of a muffler, an accelerometer secured to said adapter and constructed and arranged to measure the vibrational characteristics of said muffler under operating conditions, and cooling means for flowing a cooling medium through said passage to thereby minimize heat transfer from said muffler to said accelerometer.

4,887,461

MAGNETOSTRICTION TYPE TORQUE SENSOR

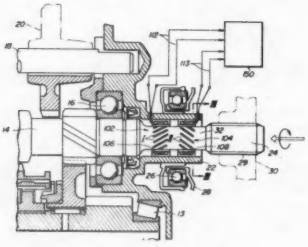
Masaki Sugimoto, Yokosuka; Nobuteru Hitomi, Yokohama; Kenji Ikeura, Zushi; Hiroyuki Hirano; Kunihiko Morikawa, both of Fujisawa; Hisashi Kitahara, and Kazuhiro Takatori, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd, Yokohama, Japan

Filed Jun. 24, 1988, Ser. No. 211,259

Claims priority, application Japan, Jun. 26, 1987, 62-159006; Jul. 13, 1987, 62-174269; Jul. 15, 1987, 62-176441

Int. Cl.[4] G01L *3/02*

U.S. Cl. 73—118.1 **14 Claims**



1. An automotive transmission comprising:

a gear train, said gear train being enclosed in a housing;

a rotatable shaft, said shaft forming part of said gear train, said shaft being enclosed within said housing;

means defining a first set of grooves in a surface of said shaft, said first grooves defining a plurality of first projections therebetween, said first grooves and said first projections being arranged at a first angle with respect to the axis of rotation of said shaft, said first projections undergoing one of compression and elongation when a torque is applied to said shaft;

a first coil, said first coil being mounted so as to juxtapose said first set of grooves, said first coil being operatively connected with a control circuit which includes a source of alternating current;

means defining a second set of grooves in said surface of said shaft, said second set of grooves defining a plurality of second projections which are arranged at a second predetermined angle with respect to the axis of rotation of said shaft, said second projections undergoing the other of compression and elongation when torque is applied to said shaft; and

a second coil, said second coil being mounted so as juxtapose said second set of grooves, said second coil being connected with said control circuit;

wherein said first and second projections are arranged to be magnetically permeable so that when subject to compression the permeability is reduced and the amount of magnetic flux which passes therethrough is reduced, and when subject to elongation the permeability is increased and the amount of magnetic flux which passes therethrough is increased.

4,887,462

AIR FLOW RATE METER

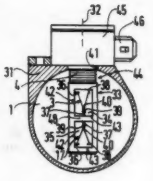
Heinz Gneiss, Ludwigsburg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 281,717

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1988, 3804797

Int. Cl.[4] G01F *1/68*

U.S. Cl. 73—118.2 **10 Claims**



1. An air flow rate meter for measuring the quantity of air aspirated by internal combustion engines, having a support body extending transversely to the air flow direction, said support body including a first aperture extending parallel to the air flow direction, a first hot wire secured in said first aperture with each of its ends and middle connected to respective end and middle support points, said first hot wire forming a loop at its middle support point in which intersecting wire segments are connected electrically conductively to one another and through which loop the middle support point protrudes, a second aperture (**35**) is embodied parallel to the first aperture (**34**) in the support body (**33**) and extends parallel to the air flow direction (**2**) and is separated from said first aperture **934**) by a web (**48**) of the support body (**33**), a second hot wire (**17**) supported in said second aperture and electrically connected to said first hot wire (**3**), said second hot wire (**17**) is supported and retained by support points (**36, 37, 38**) such that each of its ends is connected to a respective support point (**36, 38**) and is retained and supported between its ends by a loop

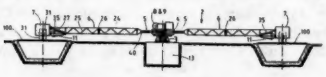
(39) in which intersecting wire segments of the loop are connected electrically conductively to one another and supported by at least one middle support point (37), which protrudes through the loop (39).

4,887,463

PAVEMENT TESTING MACHINE AND METHOD OF TESTING PAVEMENTS

William I. Wood, 59 Memorial Avenue Fendalton, Christchurch, New Zealand

Filed Nov. 2, 1987, Ser. No. 117,521
Int. Cl.[4] E01C *23/00*
U.S. Cl. 73—146 32 Claims



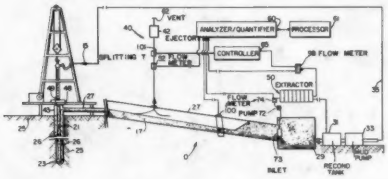
1. Apparatus for testing and evaluating traffic bearing formations and pavements comprising a plurality of bogies provided with different wheel sets to give combinations of from one to six tired wheels per bogey arranged to represent wheels of a range of vehicles; a wheel suspension system for each said bogey comprising vehicle suspension components and so constrained to move in a substantially vertical plane about fixed centres at radii within said bogey that the dynamic responses of said wheels to pavement irregularities substantially replicate the dynamic responses of actual vehicle wheels to actual road way irregularities; means for adjusting the slip angles of the tires of said wheels in relation to said pavement; a driving system for said wheels adapted to apply tractive and braking efforts to said wheels for the vehicle-type which any wheel set represents and which produces unsprung weights for the vehicle represented; means providing for compensation for the deflection of road springs when loaded and for placement of loading weights such that interactions between said tires and said pavement are not distorted by varying the wheel loads and road speed; one or more arms extending radially from a centre pivot at the inner end of said arm(s) and adapted to connect with any of the said bogies types at the outer end to constrain a bogey connected thereto to movement in a generally circular path on said pavement about said pivot during operation of said apparatus; a slide frame connecting the inner end of each radial arm to said centre pivot via a rotating bolster mounted about said pivot, said slide frame(s) being contained within said central rotating bolster and constrained to move only in a radial direction relative to said bolster and movable by rams to move said radial arms and said bogies radially in relation to said centre pivot to vary the path of said wheels carried by said bogies across the test surface; means for providing resistance to rotation of said radial arm(s) about said central pivot to simulate the ascent or descent of a gradient upon said pavement; means for varying the road speed of said wheels between zero and a maximum speed; means for varying the loadings carried by said wheels to correspond to loadings carried by vehicle wheels which said wheels represent; and an electronic control system for the apparatus programmable to cause said apparatus to operate to impose and monitor a predetermined test regime on said pavement, unattended and for an indefinite period.

4,887,464

MEASUREMENT SYSTEM AND METHOD FOR QUANTITATIVELY DETERMINING THE CONCENTRATIONS OF A PLURALITY OF GASES IN DRILLING MUD

Eli Tannenbaum, Tel Aviv, Israel; Trevor Burgess, Missouri City, Tex.; Vassilios Kalessidis; Andre Orban, both of Houston, Tex.; John Williams, Sugar Land, Tex., and Klaus Zanker, Houston, Tex., assignors to Anadrill, Inc., Sugar Land, Tex.

Filed Nov. 22, 1988, Ser. No. 274,887
Int. Cl.[4] E21B *49/00*
U.S. Cl. 73—153 23 Claims



1. A system for quantitatively analyzing gases exiting a borehole with drilling mud, wherein at least some of said gases exit as liberated gases and some of said gases exit as at least one of entrained and dissolved gases in said drilling mud, said drilling mud exiting said borehole via a substantially enclosed return line located adjacent a bell nipple atop said borehole, said system comprising:

(a) gas capturing means for capturing a substantial amount of said liberated gases in said bell nipple and said return line;

(b) gas extraction means for receiving at least some of said mud traversing said return line, and for extracting a substantial amount of said gases entrained or dissolved in said at least some drilling mud;

(c) at least one gas analyzing means for receiving said captured liberated gases from said gas capturing means and said extracted gases from said gas extraction means and for analyzing said extracted gases to provide a quantification of said gases exiting said borehole.

4,887,465

TRANSDUCERS FOR HOSTILE ENVIRONMENTS

John V. Bryne, Dublin, and Francis McMullin, Clare, both of Ireland, assignors to Kollmorgen Corporation, Simsbury, Conn.

Filed May 14, 1987, Ser. No. 49,578
Claims priority, application Ireland, May 16, 1986, 1305/86
Int. Cl.[4] G01F *23/36, 23/60, 23/72*
U.S. Cl. 73—313 3 Claims

1. A sensor comprising windings, at least one screen, and barrier means, said windings including a drive or exciting winding for establishing a forward or drive field and at least one secondary or sense winding in which a voltage may be induced in the presence of said forward or drive field, said at least one screen being a conductive screen within which eddy currents are generated in the presence of said forward or drive field to establish a counter-field opposing said forward or drive field, and said barrier means being interposed between said windings and said at least one screen, so that said at least one screen may be disposed within a region environmentally isolatable from the region in which said windings are located, said at least one screen and said at least one secondary or sense winding being displaceable relative to one another within said forward or drive field so that said at least one secondary or sense winding may be shaded by said at least one screen to a varying extent to thereby vary the voltage induced in said at least one secondary or sense winding, the relative displacement of said at least one screen and said at least one secondary or sense winding being limited to substantially a single direction of

displacement, said drive or exciting winding being configured so that in the absence of said at least one screen said forward or drive field is substantially even over said at least one secondary or sense winding in said single direction of relative displacement of said at least one screen and said at least one secondary or sense winding, said at least one secondary or sense winding being a two-terminal winding, said at least one screen having a surface region which is substantially parallel to a notional

surface defined by said at least one secondary or sense winding, said barrier means being of a relatively poorly conductive material, said at least one screen comprising the same relatively poorly conductive material as the poorly conductive material of said barrier means, said relatively poorly conductive material being stainless steel, and said at least one screen having a thickness dimension substantially in excess of the thickness of said barrier means.

4,887,466

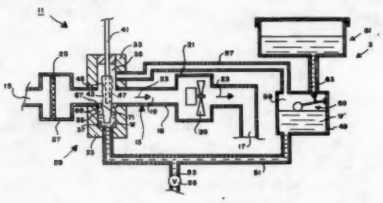
WET BULB SENSOR SYSTEM

Gil Avery, P.O. Box 341165, Memphis, Tenn. 38184

Continuation-in-part of Ser. No. 100,171, Sep. 23, 1987, abandoned. This application Apr. 26, 1988, Ser. No. 186,459

Int. Cl.[4] G01N *25/62*

U.S. Cl. 73—338 **14 Claims**



1. A wet bulb sensor system for taking the wet bulb temperature of air, said system comprising:

(a) air passageway means having an air intake for introducing air into said passageway means for the wet bulb temperature of the air to be determined, said passageway means having an air exhaust;

(b) fan means in said passageway means for drawing the air into said passageway means through said air intake and for causing the air to flow through said passageway means and out said exhaust;

(c) filter means disposed in said passageway means for filtering the air flowing through said passageway means;

(d) temperature sensor means for determining the temperature of air;

(e) an enclosed housing means having an interior, said housing defining an air chamber and a wet bulb sump in the interior thereof, said wet bulb sump having an upper end opening into said passageway means for receiving a quantity of water therein, said air chamber being in communication with said passageway means and said wet bulb sump, and said wet bulb sump defining a space above the water therein;

(f) wick means adjacent said temperature sensor means and extending into said wet bulb sump for keeping the temperature sensor moist with water;

(g) said temperature sensor means and said wick means being disposed in said passageway means between said filter means and said fan means in the path of flow of the air for determining the wet bulb temperature of the air flowing through said passageway means;

(h) tank means holding a quantity of replenishment water to replenish the water in said wet bulb sump as the water evaporates in said wet bulb sump, said tank means having a space above the water in said tank means, said space above the water in said tank means being closed to the ambient atmosphere; and

(i) water conduit means communicating said tank means and said wet bulb sump for serving as a channel for the water to flow from said tank means to said wet bulb sump for the replenishment of the water in said wet bulb sump.

4,887,467

TEMPERATURE-COMPENSATING CIRCUIT FOR ACCELEROMETERS

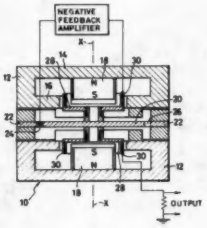
Kazuhiro Sakuma; Yasuhiko Fukumoto, and Akihiro Tomioka, all of Akishima, Japan, assignors to Japan Aviation Electronics Industry Ltd., Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 238,865

Claims priority, application Japan, Sep. 9, 1987, 62-224046

Int. Cl.[4] G01P *15/13*

U.S. Cl. 73—517 B **1 Claim**



1. A temperature-compensating circuit for an accelerometer comprising a pair of torquer coils respectively mounted on the opposite surface of a flapper interposed between a pair of magnetic structures, capacitors or a strain bridge including piezoelectric resistive elements for detecting the the deviation of the flapper from its neutral position in response to acceleration to be applied to the accelerometer and giving a direct current bridge signal representative of the deviation, a preamplifier for amplifying the direct current, a summing amplifier connected with the preamplifier, a negative feedback amplifier including a driver amplifier energized by the output of a summing amplifier, the output of the negative amplifier being supplied to the torquer coils in order to restore the flapper to its neutral position and to balance the capacitor output or to reduce the bridge output to null, a readout resistor for passing across the output of the feedback amplifier to obtain a measure of the acceleration, and for correcting the temperature change in the gain of the negative feedback amplifier to cancel the temperature change in the resistance of the torquer coil, piezo-

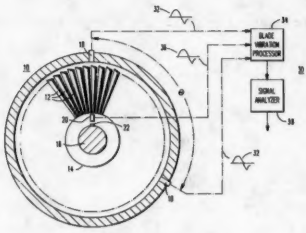
electric resistive elements or other elements in the loop whereby obtaining the least temperature change in the total loop gain of the accelerometer.

4,887,468

NONSYNCHRONOUS TURBINE BLADE VIBRATION MONITORING SYSTEM

Francis S. McKendree, Penn Hills, Pa., and Paul F. Rozelle, Fern Park, Fla., assignors to Westinghouse Electic Corp., Pittsburgh, Pa.

Filed Jun. 3, 1988, Ser. No. 202,742
Int. Cl.[4] G01M *1/22*; G01H *11/00*
U.S. Cl. 73—660 **17 Claims**



1. An apparatus for detecting the vibration of unshrouded turbine blades configured in a row, comprising:

a maximum of two sensor means circumferentially mounted along the turbine blade row;

means responsive to said sensor means for producing data based on the actual arrival times of the blades at said sensor means;

means for producing data based on the expected arrival times of the blades at said sensor means;

means for comparing said actual arrival time data to said expected arrival time data to obtain turbine blade deflection data; and

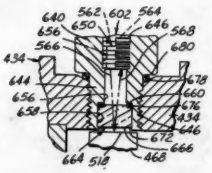
analysis means for extracting from said turbine blade deflection data torsional vibration data and the extent of vibration at each non-integral harmonic.

4,887,469

HIGH ACCURACY TURBINE FLOWMETER WITH OPTICAL SENSOR

David R. Shoptaw, Livonia, Mich., assignor to Hydro-Craft, Inc., Rochester Hills, Mich.

Filed May 11, 1988, Ser. No. 193,293
Int. Cl.[4] G01F *1/10*
U.S. Cl. 73—861.77 **7 Claims**



1. A turbine flowmeter provided with optical means for measuring fluid flow, comprising:

a flowmeter body having a substantially cylindrical bore through which a fluid to be measured flows and having a first opening in the body extending to the bore;

a turbine located entirely with the bore and having a plurality of vanes rotatable about the axis of and within the bore in response to fluid impinging upon the vanes as the fluid flows through the bore;

protective window means for enabling movement of the vanes to be detected optically, the window means being disposed in the opening in the body such that each vane in turn is optically detectable at a predetermined location within the bore as it rotates by the window means, the window means including (1) a window made of generally transparent material resistant to thermal shock and having two opposed optically polished surfaces, the window having an annular recess adjacent one of its polished surfaces. (2) a protective casing for captively supporting the window along at least substantially all of its periphery, the casing being provided with a hole including two portions of different diameters, and having an annular shoulder formed at a boundary between the two hole portions, and (3) an annular gasket disposed at least partly within the recess between one side of the window and the annular shoulder; and

means for generating an electrical signal indicating whether a vane is optically detected through the window in the predetermined location, and wherein

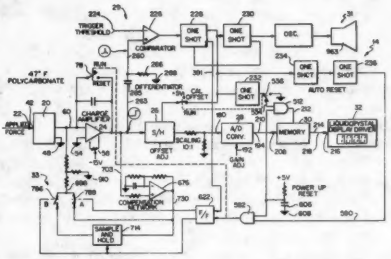
the shoulder, the recess and the annular gasket cooperate to enable the window to withstand a static pressure difference of at least about 300 atmospheres across the two opposed polished surfaces of the window produced by a high-pressure condition in the fluid in the passage.

4,887,470

WIRE BOND FORCE CALIBRATION METER

Eric G. Flyer; Richard A. Krusing, both of Phoenix, Ariz., and Elmer L. Moseley, Ft. Worth, Tex., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 12, 1988, Ser. No. 231,406
Int. Cl.[4] G01L *5/00*, *1/16*
U.S. Cl. 73—862.68 **7 Claims**



1. A wire bonding force calibration for measuring a force applied thereto comprising:

a transducer for sensing a force applied thereto and having an output;

a charge amplifier having an input connected to the output of the transducer and having an output;

a sample and hold unit having a first input connected to the output of the charge amplifier and having a second input and having an output;

an analog to digital converter having an input connected to the output of the sample and hold unit and having an output;

a memory unit having a first input connected to the output of the converter and having a second input and having an output;

a display having an input connected to the output of the memory unit; and

a timing circuit having an input connected to the output of the charge amplifier and having a first output connected

to the second input of the sample and hold unit and having a second output connected to the second input of the memory unit and having a third output and having a fourth output and having a fifth output.

4,887,471

COMPENSATION FOR SENSITIVITY DRIFT IN MAGNETOELASTIC FORCE TRANSDUCERS

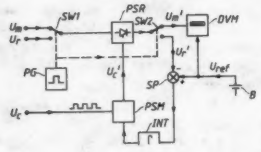
Pavel Kolavcic; Jarl Sobel, and Lars Örnholmer, all of VästerÅs, Sweden, assignors to Asea Brown Boveri AB, VästerÅs, Sweden

Filed Aug. 11, 1988, Ser. No. 230,995

Claims priority, application Sweden, Aug. 24, 1987, 8703267

Int. Cl.[4] G01L 1/12

U.S. Cl. 73—862.69 **4 Claims**



1. A magnetoelastic force transducer compensated for sensitivity drift, comprising:

a measuring transducer providing an output measuring signal;

a reference transducer made of the same material as the measuring transducer and arranged in good thermal contact with the measuring transducer to ensure temperature conformity between said measuring transducer and said reference transducer;

excitation means supplying current through said reference transducer proportional to the supply current through said measuring transducer;

said reference transducer including a winding for providing a reference signal proportional to the magnetic flux;

a phase-sensitive rectifier selectively receiving one of said reference signal and said output measuring signal in addition to a control voltage and providing an output signal during a respective

calibrating period and a measurement period;

a difference generator receiving said output signal and a reference voltage and providing a difference output;

means responsive to said difference output for controlling the output of said phase-sensitive rectifier by controlling the phase position of said control voltage to be equal to said reference voltage;

the output measuring signal of said measuring transducer is input to said phase-sensitive rectifier during said measurement period; and

said phase-sensitive rectifier controls said control voltage and the output signal constituting the drift-compensated measured value during said measurement period.

4,887,472

SAMPLER

Adolf E. Jansen, Rotterdam, Netherlands, assignor to Douwes Vastgoed B.V., Rotterdam, Netherlands

Filed Nov. 22, 1988, Ser. No. 275,076

Claims priority, application Netherlands, Dec. 2, 1987, 87 02896

Int. Cl.[4] G01N 1/00

U.S. Cl. 73—863.86 **14 Claims**

1. A sampler mechanism for the interconnection of a valve having a plurality of positions and the interior space of a sample bottle having as a closure therefor a resealable septum, said sample mechanism comprising:

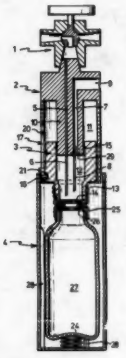
(a) a hood component in mating engagement with said valve at one end of said hood component, and further comprising:

(i) a first passageway therethrough in fluid communication with said valve at one end thereof, and terminating with a needle tip at the opposite end thereof; and

(ii) an externally vented second passageway extending for at least a portion of the length of said hood component and terminating with a needle tip at the end of said hood component opposite said valve;

(b) a sleeve component in mating, reciprocal engagement with said hood component at one end thereof, said sleeve component having a cavity therethrough defining an internal plenum through which the needle tips at the termination of the passageways of said hood component may travel as said hood component and sleeve component reciprocate; and

(c) a bottle retainer component in mating, reciprocal engagement with said hood component, said bottle retainer component adapted to receive and hold therein a sample bottle with an interior space and having as a closure therefor a resealable septum, for the purpose of sampling,



and wherein said mechanism is further provided with means to permit reciprocation between an inserted position in which the needle tips of said hood component are inserted through the resealable septum of a sample bottle and penetrate into the interior space of said sample bottle, permitting interconnection and fluid communication between the valve and the interior of said sample bottle, and a withdrawal position in which the needle tips of said hood component are not inserted through the septum and do not penetrate into the interior of said sample bottle and wherein said sleeve component is provided with means for attaching a resealable septum at the end of said cavity opposite said hood component, whereby the needle tips can be rinsed directly before or after sampling.

4,887,473

BELLOWS PUMP AND ACTUATING APPARATUS

Oscar Proni; Ervin Fayer, both of Hollywood; George G. Dominick, Miramar, and Carmelo R. Cambareri, Plantation, all of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

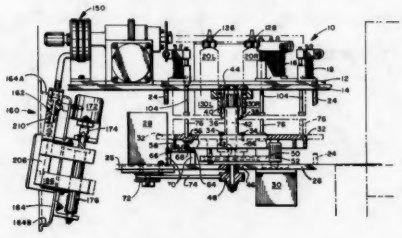
Filed Oct. 14, 1988, Ser. No. 257,597

Int. Cl.[4] G01N 1/14

U.S. Cl. 73—864.35 **10 Claims**

1. Bellows pump and actuating apparatus for automatically aspirating sample fluid material from a source thereof into and through a counting aperture for counting individual elements within the sample, said apparatus comprising a plurality of bellows members mounted on a fixed member and having an axis of compression and expansion, timing and stroke means for timing the compression and expansion stroke of said bellows

members, moving means for moving said timing and stroke means parallel to the axis of compression and expansion of said bellows members, positioning means for positioning said timing and stroke means coaxially of said bellows members at preselected times, and indicating means cooperating with said



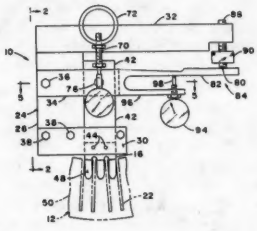
positioning means for: interrupting the movement of said positioning means when said timing and stroke means are coaxially aligned with said bellows members, for moving said moving means, thereby causing said timing and stroke means to compress or expand said bellows members, thereupon producing pressure or vacuum for aspirating said sample material.

4,887,474

CLAMP TIGHTNESS TOOL FOR STATOR CORES

John B. Sargeant, Oviedo, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 6, 1989, Ser. No. 306,187
Int. Cl.[4] G01N *3/08*
U.S. Cl. 73—865.9 **11 Claims**



1. A clamp tightness gauge for determining the clamping tightness of compressed sections having passages between adjacent section, the gauge having:

a frame;

a pair of spaced apart fingers having opposed insertable ends adapted to be inserted into a passage between compressed adjacent sections, at least one insertable and being resilient;

an arm pivotably attached to the frame;

a loading means moveably mounted on the frame in operative engagement with the pivotably attached arm for pivoting the arm;

a wedge member operatively attached to the pivotably attached arm and having a tapered end, the tapered end slideably engaged with the opposed insertable ends of the fingers for urging the opposed insertable ends of the fingers against the sections when the loading means operatively engages the pivotably attached arm;

means connected to the wedge member for determining the slideable displacement of the tapered end of the wedge member; and

means connected to the pivotably attached arm for determining the force exerted on the tapered end of the wedge member through the insertable ends of the fingers by the sections.

4,887,475

APPARATUS AND METHOD FOR MARKING BULK LOADED CONTAINERS TO INDICATE THE PRESENCE OF METALLIC CONTAMINANTS

Thomas F. Austin, Vineland; Frank L. Donadio, Jr., Pitman; David F. Rudolph, Monroeville, and Robert W. Shaw, Jr., Berlin, all of N.J., assignors to Gill & Duffus Products, Inc., Glassboro, N.J.

Filed May 20, 1988, Ser. No. 196,324
Int. Cl.[4] B65B *1/04*
U.S. Cl. 73—866 **3 Claims**

1. Apparatus for loading powdered material into a flexible container having an exterior surface, said apparatus comprising:

(a) a chamber for holding a powdered material;

(b) a filler tube operatively connected to said chamber and formed to be inserted into the flexible container;

(c) support means for supporting the flexible container;

(d) means for fluidizing the powdered material in said chamber such that the powdered material flows from said chamber, through said filler tube and into the flexible container;

(e) detection means associated with said filler tube for providing a detection signal indicative of the presence of metallic contaminants which flow through said filler tube into the flexible container; and

(f) means responsive to the detection signal for applying an indelible fluid to the bottom of the exterior surface of the flexible container, said indelible fluid application means including:

(1) a reservoir of indelible fluid;

(2) a source of compressed air;

(3) a spray gun operatively connected to receive indelible fluid from said reservoir and pressurized air from said compressed air source;

(4) control means operatively connected to said detection means and between said spray gun and said source of compressed air such that the pressurized air is applied to said spray gun in response to the detection signal; and

(5) mounting means for mounting the spray gun adjacent to said support means such that the indelible fluid can be sprayed onto the bottom of the exterior surface of the flexible container;

whereby the presence of metallic contaminants in the flexible container is clearly indicated by an indelible mark on the bottom surface of said flexible container when the container is stacked with other containers in a manner in which the bottom surface is visible.

4,887,476

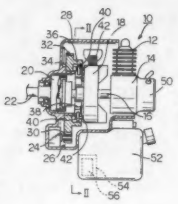
SMALL ENGINE PROVIDED WITH SELF STARTING MOTOR

Yukio Yokoyama, Chiba, Japan, assignor to Tanaka Kogyo Co., Ltd., Chiba, Japan

Filed Sep. 13, 1988, Ser. No. 243,674
Int. Cl.[4] F02N *15/02*
U.S. Cl. 74—7 E **3 Claims**

1. A small engine provided with a self starter comprising a reduction drive gear provided in a freely rotatable fashion in surrounding coaxial relation to a crankshaft, a pinion of the starter engaged with the reduction drive gear, rotator means axially mounted on the crankshaft and engaged with the reduc-

tion drive gear, a cylindrical support provided concentrically with and in surrounding relation to the crankshaft, the reduc-



tion drive gear being loosely inserted over the cylindrical support.

4,887,477

LINEAR DRIVE SYSTEM

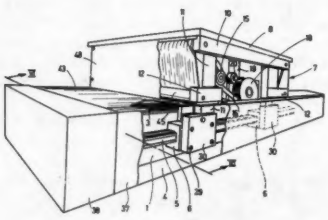
Karl-Heinz Hauser, Steinenbronn; Uwe Heissel, Pliezhausen, both of Fed. Rep. of Germany; Walter Inauen, Tann-Rüti, Switzerland; Karl Neff, Waldenbuch, and Manfred Ringger, Nürtingen, both of Fed. Rep. of Germany, assignors to NEFF Gewindespindeln GmbH, Waldenbuch, Fed. Rep. of Germany

Filed Jan. 18, 1989, Ser. No. 298,646

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1988, 8802615[U]

Int. Cl.[4] F16H *27/02*

U.S. Cl. 74—89.17 15 Claims



1. Linear drive system for linearly moving a movable machine element (7, 8) along a predetermined guide path, having

a base element (2) including means (5) for defining said guide path;

a toothed or gear belt (22) and means (13-18, 20) for driving said toothed or gear belt supported on said machine element; and

a rack means (3) positioned for engagement with said gear belt (22),

wherein, in accordance with the invention,

said base element (2) includes a slab or block of plastic concrete in which said rack means (3) are formed, so that said slab and rack means form a unitary element; and

wherein said slab carries said guide path defining means (5).

4,887,478

MULTIPLE-STEP GEAR DRIVE

Karl E. Neuman, Gräddö , Sweden, assignor to Neos Products HB, Karlsson, Neuman, Tamm, Sweden

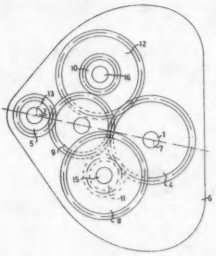
PCT No. PCT/SE86/00558, § 371 Date Jun. 14, 1988, § 102(e) Date Jun. 14, 1988, PCT Pub. No. WO87/03662, PCT Pub. Date Jun. 18, 1987

PCT Filed Dec. 9, 1986, Ser. No. 209,481

Claims priority, application Sweden, Dec. 11, 1985, 8505850

Int. Cl.[4] F16H *3/34*

U.S. Cl. 74—354 12 Claims



1. A multiple-step gear drive comprising a first stationary in position but rotatable toothed wheel and a first rotatable shaft on which the first toothed wheel is mounted; a second stationary in position but rotatable toothed wheel spaced from the first toothed wheel and a second rotatable shaft on which the second toothed wheel is mounted, a respective gear train for each gear step, each gear train comprising at least one drive-connected gear, a housing in which all the gears are rotatably journalled and the housing being movable substantially arcuately with reference to the first shaft for the housing to be brought into a respective specific engagement position for each gear step, and at each gear step the respective gear train is in simultaneous contact with the first and second toothed wheels; the first and second toothed wheels being spaced at a preset distance apart the gear trains being sized and shaped for enabling the selective contact of each one of the gear trains with both of the first and second wheels at the respective gear step, wherein in at least one gear step, the housing can be disengaged from its engagement position and can be moved selectively in two substantially opposite directions for moving the corresponding gear train in a selected direction and thereby breaking the driving connection between the first and second toothed wheels established in the engagement position.

4,887,479

BALL CAGE FOR HELICAL BALLSPLINE

Edwin K. Griffey, Selma, Ind., assignor to Sundstrand Corporation, Rockford, Ill.

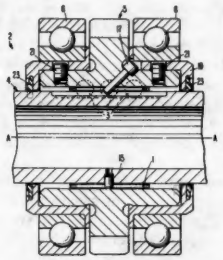
Filed Jul. 26, 1988, Ser. No. 225,022

Int. Cl.[4] F16H *25/22;* B64C *13/34;* G08B *21/00*

U.S. Cl. 74—424.8 NA 11 Claims

1. A ball cage for controlling ball movement and spacing in a helical ballspline comprising cage means for accommodating thrust transmitting balls of a helical ballspline, said cage means adapted to be arranged between a helically threaded inner member and a complimentary helically threaded outer member of the helical ballspline which are displaceable relative to one another along a helical path formed by the threads thereof with said thrust transmitting balls accommodated by said cage means being arranged in said helical path, said cage means including means for axially and rotatably translating said cage means with respect to both said inner and outer members during relative displacement of said inner and outer members

for guiding the cage in a helical movement corresponding to a rolling movement imparted to the balls by relative displacement between the inner and outer members of the helical ballspline.



4,887,480

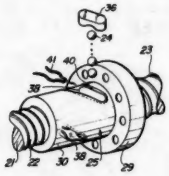
EXTERNALLY SERVICEABLE BALL SCREW HAVING INTERNAL RETURN MEANS

Joseph L. Pollo, Farmington Hills, Mich., assignor to American Ball Screw, Livonia, Mich.

Filed Dec. 14, 1987, Ser. No. 132,600

Int. Cl.[4] F16H *25/24*

U.S. Cl. 74—459 **8 Claims**



1. An improved ball screw assembly including:
(a) a ball screw having a helical ball race,
(b) a ball nut having an externally servicable internal return means, and a complementary ball race, said externally servicable internal return means including:
(i) at least one return opening provided in said ball nut,
(ii) an internal return insert operatively mounted in said return opening, and
(iii) means to removably retain said internal return insert in said return opening, wherein said retaining means include:
(a) a dove-tail slot provided contiguous with said return opening,
(b) a spring clip mounted in said dove-tail slot to retain said internal return insert, and
(c) a plurality of ball bearings inserted between said ball screw and said ball nut.

4,887,481

REMOTE CONTROL MECHANISMS

David J. Crack, Chelmsford, England, assignor to Morse Controls Limited, Basildon, England

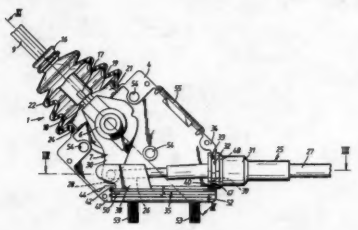
Filed Mar. 23, 1988, Ser. No. 172,277

Claims priority, application United Kingdom, Apr. 3, 1987, 8707998

Int. Cl.[4] F16C *1/10*; G05E *1/04*

U.S. Cl. 74—500.5 **20 Claims**

1. A remote control mechanism comprising a member mounted for movement in a housing a cable having a core translatable within a casing, transverse aperture means associated with one of the cable core and the member for receiving a transverse connecting part associated with the other of the cable core and the member by which the cable core and the member are operatively connected, and cover plate means for fitment to the housing and serving to engage the cable casing with respect to the housing to prevent translation of the cable casing, wherein the cover plate means has itself an engaging means for restraining the cover plate means within the housing so that when engaging the cable casing with respect to the housing, the cover plate is itself by such action restrained from removal from the housing.



4,887,482

CABLE-GUIDE ELEMENT FOR THE REAR DERAILER OF A BICYCLE

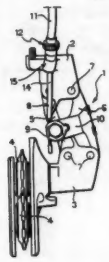
Antonio Romano, Padova, Italy, assignor to Campagnolo S.r.l., Vincenza, Italy

Filed Jun. 9, 1989, Ser. No. 363,813

Claims priority, application Italy, Jun. 15, 1988, 53337/88[U]

Int. Cl.[4] F16C *1/10*

U.S. Cl. 74—502.6 **1 Claim**



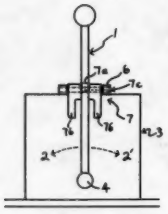
1. A rear derailer for bicycles comprising:
a first body for fixing to a bicycle frame,
a second body which carries two wheels for guiding a bicycle chain;
means which connect the second body to the first body and enable the second body to be displaced relative to the first body,
a metal operating cable having one end fixed to the means for displacing the second body relative to the first body, and
a cable-guide sheath provided at one end with a support element having a hemispherical end portion, the first body defining a seat which has a shape corresponding to that of the end portion and in which the hemispherical end portion is supported for rotation, wherein the support element is provided with a tubular extension for guiding the cable, the extension projecting from the hemispherical portion, passing through the first body, and extending almost to the fixed end of the cable.

4,887,483

SPEED SENSITIVE SAFETY LOCK FOR ARRESTING A RUNAWAY CONTROL LEVER

Guenter Vollath, 50 Wildey St., Tarrytown, N.Y. 10591

Filed Jun. 19, 1987, Ser. No. 63,840
Int. Cl.[4] G05G *1/04*
U.S. Cl. 74—526 2 Claims



1. A speed sensitive safety lock in combination with a control lever pivotably movable along a control path in a vertical plane parallel to and spaced apart opposite from a stationary member, said safety lock comprising:

a mounting portion which is mounted to said stationary member;

a unitary arresting member pivotably supported on said mounting portion by a pivot pin so as to be swingable under gravity perpendicularly to said vertical plane and including a knob provided on an upper end thereof and positioned to normally project partway into said control path, and an arresting portion formed by a pair of spaced apart leg sections at a lower end thereof extending vertically downward parallel to said vertical plane which is displaceable to an arresting position where it arrests said control member on said control path in response to a glancing contact applied with more than a predetermined threshold force to said knob; and

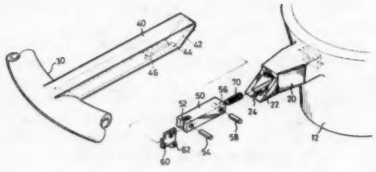
the control lever having a portion which is positioned to make glancing contact with said knob of said arresting member when moved along said control path past said stationary member, wherein said control lever portion strikes said knob with a force greater than said threshold predetermined force when moved at a high speed in excess of a predetermined speed level past said stationary member, thereby causing said leg sections of said arresting portion to be displaced to said arresting position to arrest said control lever.

4,887,484

STEERING WHEEL ASSEMBLY

Hsiang Peng, 2 Fl., No. 1, Lane 378, Sec. 1, Mu Cha Rd., Taipei, Taiwan

Filed Jun. 22, 1989, Ser. No. 369,951
Int. Cl.[4] G05G *1/10;* B60R *25/02*
U.S. Cl. 74—556 1 Claim



1. A steering wheel assembly comprising:

a central hub having a plurality of inner spokes integral to said central hub, said central hub being part of a steering shaft, said inner spokes each being radially extended from said central hub and having a first oblique surface at a free end thereof, said inner spokes each being hollow and having a first elongate slot formed thereon;

a rim part having a plurality of outer spokes integral to said rim part, said plurality of outer spokes being corresponding in number to said inner spokes, said outer spokes each being radially extended from said rim part and having a second oblique surface at a free end thereof, said outer spokes each being hollow and having a second elongate slot with an adjacent receiving hole; each of said outer spokes being alignable with a corresponding inner spoke; and

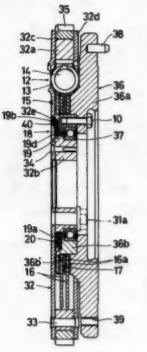
respective linking means for engaging said outer spoke with said inner spoke; said linking means comprising a sliding block, a fixing plate and a spring; said spring being interconnected between said central hub and one end of said sliding block, said fixing plate being hinged to another end of said sliding block and having a protuberance thereon, said sliding block being slidable within both said inner and outer spokes, said fixing plate being slidable within said first and second elongate slots and being releasably engageable with said receiving hole of said outer spoke.

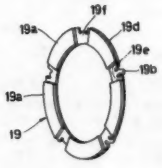
4,887,485

TORQUE VARIATION ABSORBING DEVICE

Kiyonori Kobayashi, Chiryu; Masakazu Kamiya, Toyoake; Junji Kagiyama, and Motoi Hyodo, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 895,821, Aug. 12, 1986, abandoned.
This application Nov. 2, 1987, Ser. No. 117,404
Claims priority, application Japan, Sep. 20, 1985, 60-144676
Int. Cl.[4] F16F *15/10;* F16D *3/14*
U.S. Cl. 74—574 7 Claims





1. A torque variation absorbing device comprising:

a first flywheel member mounted for rotation about an axis and connected to a crankshaft of an engine,

a second flywheel member disposed parallel to and coaxial

with said first flywheel member and rotatably supported by said first flywheel member by a bearing means, and

a first spring mechanism, a damping and torque limiting mechanism and a hysteresis mechanism interposed between said first flywheel member and said second flywheel member, said hysteresis mechanism comprising a friction plate means and a second spring mechanism, said damping and torque limiting mechanism is positioned radially inwardly of said first spring mechanism, and said hysteresis mechanism is located radially inwardly of said damping and torque limiting mechanism,

said friction plate means including a ring plate and a friction lining means fastened to an axially facing surface of said ring plate, said ring plate having at a circumferentially extending edge portion thereof a first connecting means, said surface defining a border area contiguous with and bordering said first connecting means,

one of said first and second flywheel members having a second connecting means connected to said first connecting means for establishing a drive connection therebetween,

one of said first and second connecting means comprising an axially extending pawl member and the other of said first and second connecting means comprising an opening receiving said pawl member,

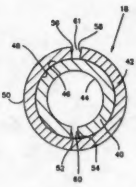
said friction lining means comprising a plurality of separate arcuate segments disposed circumferentially on said surface of said ring plate and spaced circumferentially apart to define therebetween a channel coinciding with said border area, whereby said friction lining means is situated outside of said border area and wherein a radial edge of said friction lining means is disposed radially beyond an edge of said first connecting means to a radial edge of said ring plate adjacent said first connecting means.

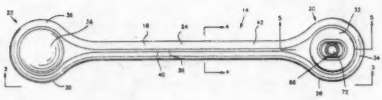
4,887,486

LINKAGE COMPONENT

Ruey E. Wood, Jr., St. Clair Shores, Mich., assignor to TRW, Inc., Lyndhurst, Ohio

Filed Feb. 22, 1988, Ser. No. 158,927
Int. Cl.[4] G05G *1/00*
U.S. Cl. 74—588 **11 Claims**





1. A component for use in a vehicle linkage, said component comprising:

a joint portion, said joint portion including a housing and a stud which is at least partially enclosed by said housing, means in said housing for supporting said stud for pivotal movement relative to said housing, said housing including a first side section and a second side section which is connected to said first side section, said first and second side sections having flange portions one of which is folded over the other to interconnect said first and second side sections, said stud extending through an opening in one of said side sections; and

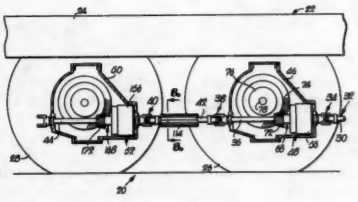
a rod portion having a double-layered wall over a major portion of its circumferential extent and including a tubular inner layer and a tubular outer layer which is coaxial with said tubular inner layer, said tubular outer layer defining a substantially closed chamber therein and enclosing said tubular inner layer in said chamber, said tubular outer layer of said rod portion and said first side section of said housing comprising one piece, and said tubular inner layer of said rod portion and said second side section of said housing comprising one piece.

4,887,487

HYDRO-PLANETARY POWER DIVISION SYSTEM

Alfred B. Mayfield, Verdel, Nebr., assignor to Charles D. Johnson, McPherson, Kans., a part interest

Filed May 3, 1988, Ser. No. 190,349
Int. Cl.[4] F16H *47/04*
U.S. Cl. 74—687 **14 Claims**



1. A hydraulic power division system for transferring rotational movement from a source of rotary power to at least two secondary driveshafts comprising:

a primary driveshaft adapted for connection with a source of rotary power;

first and second drive gears connected to said primary driveshaft at spaced apart locations along the latter;

first and second driven gears associated with said first and second drive gears respectively;

first and second secondary driveshafts connected to said first and second driven gears respectively;

first means interconnecting said first drive gear and said first driven gear for rotation of said first driven gear at any one of a number of velocities relative to the rotational velocity of said first drive gear and thereby of said primary driveshaft,

said first means including planetary gears, and a spider carrying said planetary gears and supported for rotation around said primary driveshaft;

second means interconnecting said second drive gear and said second driven gear for rotation of said second driven gear at any one of a number of velocities relative to the rotational velocity of said second drive gear and thereby of said primary driveshaft; and

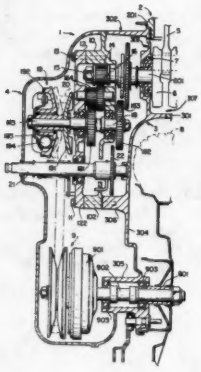
hydraulic means coupling said first means to said second means for varying the rotational velocity of said first driven gear relative to said primary driveshaft in generally proportional relationship to the variance in rotational speed of said second driven gear relative to said primary driveshaft in order to permit a corresponding variation in rotational velocity of said first secondary driveshaft relative to the rotational velocity of said second secondary driveshaft.

4,887,488

POWER TRANSMISSION ASSEMBLY OF BELT-TYPE

Kunio Miyazaki, Fujimi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1983, Ser. No. 550,530
Claims priority, application Japan, Nov. 10, 1982, 57-197949
Int. Cl.[4] F16H *37/02*
U.S. Cl. 74—689 2 Claims



1. A power transmission system of the belt-type for a motorcycle having in inverted L-shaped frame; an integrated power unit including an engine having a crankshaft, a crankcase and a transmission; a rear wheel on an axle supported in the rear of the transmission; and a swing power unit support means including a pivot link pivotally interconnecting the engine to a lower portion of the frame and a rear cushion unit including at least one shock absorber bridging an upper portion of the frame and a rear portion of the transmission; the transmission including a driving pulley associated with the engine; a driven pulley associated with the axle and coaxial therewith for driving the axle, and a belt running between the driving pulley and the driven pulley; the power transmission system being characterized in that a gear reduction mechanism comprising a plurality of gears mounted in the transmission is interposed between said crankshaft of said engine and said driving pulley, and a drive shaft which drives said driving pulley is parallel with said crankshaft and offset in the radial direction therefrom.

4,887,489

BOWL-MILL GEARING

Hans Sigg, Mutschellen, Switzerland, assignor to MAAG Gear-Wheel & Machine, Co. Ltd., Zurich, Switzerland

Filed Dec. 28, 1987, Ser. No. 138,146
Claims priority, application Switzerland, Apr. 9, 1987, 1371/87
Int. Cl.[4] F16H *1/28*
U.S. Cl. 74—801 6 Claims

1. A bowl-mill gearing comprising:

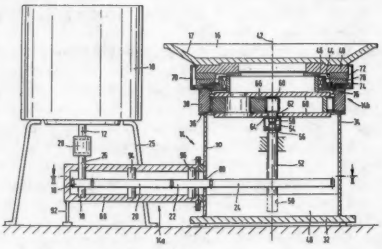
(a) an annular gear case having an internal diameter D_1 and a cut out portion;

(b) a receiving plate, which can be driven about a vertical mill axis, for a grinding bowl;

(c) a thrust bearing to support the receiving plate on the annular gear case;

(d) an epicyclic gear through which the receiving plate can be driven; and

(e) intermediate gear for driving the epicyclic gear, said intermediate gear comprising a plurality of spur wheels having parallel axes, a driving shaft having an axis parallel to the axes of the spur wheels and a driven shaft having an axis parallel to the axes of the spur wheels and the axis of the drive shaft, said driven shaft being arranged within the annular gear case coaxial with the receiving plate and coupled to a sun gear of the epicyclic gear wherein the driven shaft carries one of the spur wheels as a driven wheel of the intermediate gear whereby another of the spur wheels having a diameter D_2 penetrates the cut-out portion of the annular gear case and meshes with the driven wheel for driving same, the driven wheel having an



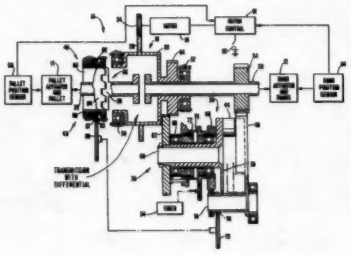
external diameter D_3 substantially equal to but less than the internal diameter D_1 of the annular gear case and greater than diameter D_2 and proximate to the cut-out portion thereby minimizing the size of the cut-out portion of the annular gear case penetrated by said another spur wheel so as to prevent weakening of the annular gear due to large axial forces acting on the receiving plate.

4,887,490

SEQUENTIAL MECHANICAL MODE SHIFTER

David E. Russ, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 14, 1988, Ser. No. 218,889
Int. Cl.[4] B60K *41/00*
U.S. Cl. 74—844 19 Claims



1. A system for sequentially activating a plurality of actuation systems in a timed sequence comprising:

(a) a first actuation system to be actuated to move between a first position and a second position and back to the first position;

(b) a second actuation system to be actuated to move between a first position and a second position and back to the first position, the motion of the second actuation system being sequential with the motion of the first actuation system;

(c) a transmission having an input, a first output mechanically connected to the first actuation system with the first output being free to rotate when the first actuation system is at the first position and is fixed when the first actuation system is in the second position and a second output mechanically connected to the second actuation system with

the second output being fixed when the second actuation system is in the first position and is free to rotate when the second actuation system is in the second position and with both the outputs rotating during a common time interval of the sequential activation of the plurality of activation systems;

(d) a single motor, coupled to the input of the transmission, for applying power to the transmission for supplying power to move the first and second actuation systems; and

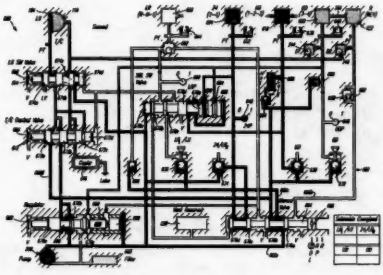
(e) a timer for controlling the moving of the first and second actuation systems between the first and second positions and back to the first position.

4,887,491

SOLENOID-ACTUATED VALVE ARRANGEMENT FOR A LIMP-HOME MODE OF AN AUTOMATIC TRANSMISSION

Gerald L. Holbrook, Rochester Hills, and Maurice B. Leising, Clawson, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 187,770
Int. Cl.[4] B60K *41/06*
U.S. Cl. 74—866 **3 Claims**



1. A fluid system in an electronically controlled vehicle transmission to allow the transmission to operate in a plurality of forward and reverse operating modes of a gear assembly in the absence of electrical power, said system comprising:

a pair of normally applied solenoid-actuated valve means controlling engagement and disengagement of at least one fluid actuating device and having a non-energized position for allowing fluid flow to at least one fluid actuating device in the absence of electrical power and an energized position for venting fluid flow to the at least one fluid actuating device in the presence of electrical power;

a pair of normally vented solenoid-actuated valve means controlling engagement and disengagement of at least one fluid actuating device and having a non-energized position for venting fluid flow to at least one fluid actuating device in the absence of electrical power and an energized position for allowing fluid flow to the at least one fluid actuating device in the presence of electrical power;

manually actuated valve means to command a predetermined operating mode; and

said normally applied solenoid-actuated valve means and said normally vented solenoid-actuated valve means being arranged such that in the absence of electrical power, said manually actuated valve means being moveable to switch the fluid flow between said normally applied and normally vented valve means to allow at least a pair of fluid actuating devices to selectively change the operating mode to allow the transmission to operate either in at least one forward or reverse operating modes.

4,887,492

METHOD FOR MAKING LOW ALPHA COUNT LEAD

John A. Dunlop, Veradale, Wash.; Edward F. G. Milner, Trail, Canada; Robert W. Smyth, Trail, Canada, and Gerald W. Toop, Trail, Canada, assignors to Cominco Electronic Materials Inc., Spokane, Wash.

Continuation-in-part of Ser. No. 98,853, Sep. 21, 1987, Pat. No. 4,770,698. This application Aug. 29, 1988, Ser. No. 237,747
Int. Cl.[4] C22C *1/00*
U.S. Cl. 75—77 **6 Claims**

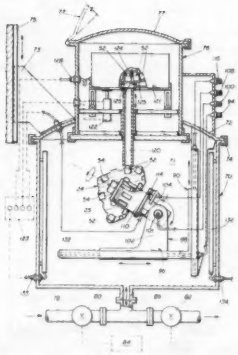
1. A method for the production of lead with a low emission of alpha particles which comprises the steps of selecting an orebody containing lead mineral comprising galena in a coarsely-disseminated form substantially free of impurities, and in a carbonate-type host rock together with associated minerals and relatively low in alpha emitters; mining said ore body to produce a mined ore; milling said mined ore to form ground ore having particle sizes such that separation of lead mineral from said host rock and associated minerals can be effected; forming a fluid suspension of said ground ore; subjecting said suspension to a gravity separation to remove said host rock and associated minerals from said lead mineral; recovering said lead mineral as a lead concentrate; subjecting said concentrate to a reduction; carrying out said reduction without the addition of an oxygen-bearing gas with sodium carbonate at a temperature of at least about 850° C., said sodium carbonate having no or a low emission of alpha particles, to form reacted material from which lead is recovered; and recovering lead having an alpha count of 0.02 particle per cm^2 per hour or less from said reduction.

4,887,493

ROLLER CUTTER DRILL BIT AND METHOD OF FORMING

Eric F. Drake, Houston, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Jul. 13, 1988, Ser. No. 218,642
Int. Cl.[4] B21K *57/02*
U.S. Cl. 76—5 R **22 Claims**



1. A method of mounting cutting inserts within sockets of a metal roller cutter body of a rotary drill bit comprising the following steps:

forming a cutter body of a metal material having a minimum yield strength of at least 160,000 psi after final assembly in the rotary drill bit;

forming sockets in the cutter body;

heating the roller cutter body with the socket formed therein to a predetermined temperature of at least around 500° F. in a controlled environment in a heat chamber;

placing cutting inserts in a slip fit essentially by gravity within said sockets when said cutter body is heated to said

predetermined temperature in said controlled environment with said inserts and sockets being sized to provide a clearance between the inserts and sockets when the inserts are initially positioned within the sockets; and

cooling said cutter body to a predetermined low temperature within a controlled environment to provide an interference shrink fit between the sockets and the inserts of at least 0.001 inch for each inch of diameter of said inserts.

4,887,494

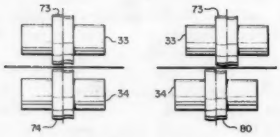
SAW BENCHING ROLLS

Lenard T. Readshaw, Port Alberni; Cornelis N. VanVelzen; John L. Paquette, both of Qualicum Beach, and Kenneth O. McKeown, Port Alberni, all of Canada, assignors to Innovations Ltd., Port Alberni, Canada

Filed Sep. 17, 1987, Ser. No. 97,852

Int. Cl.[4] B23D *63/18*

U.S. Cl. 76—27 **12 Claims**



1. A set of saw benching rolls, each of said rolls having a surface operable to contact a saw and to bench said saw between said surfaces, each of said surfaces including a concave and convex portion, each of said portions being operable to apply pressure on said saw relative to said other portion.

4,887,495

METHOD OF MANUFACTURING A DOUBLE-EDGED PEELING KNIFE

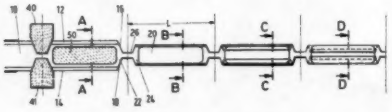
Wilhelm Pallien, Huettingen/Kyll, Fed. Rep. of Germany, assignor to Alfred Boerner GmbH, Fed. Rep. of Germany

Filed Oct. 12, 1988, Ser. No. 256,460

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734641

Int. Cl.[4] B21D *53/64*

U.S. Cl. 76—104 R **7 Claims**



1. A method for manufacturing a double-edge peeling knife, said method comprising the steps of providing a strip of steel having sharpened edge portions along each side of the strip; punching parting notches in the strip along each edge to form blanks being interconnected by a connecting web, punching out a center region of each blank to form an aperture having a width greater than half the width of the strip while leaving the sharpened blade portions, said aperture having a length which is less than the length of each blank to form a bridge portion and connecting the web at each end of the blank; bending the sharpened blade portions relative to the remaining portion of the blank; bending the blade portions over onto the remaining portion of the blank severing the connecting web and deforming the bridge sections and the blank into an arcuate configuration.

4,887,496

METHOD OF MAKING DRILLS, ENDMILLS AND OTHER ROTATING-AND-CUTTING TOOLS

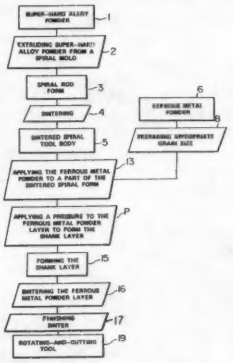
Yoshinobu Kobayashi, 2047 Shimotsuruma, Yamoto-shi, Kanagawa-ken, Japan

Filed Sep. 21, 1988, Ser. No. 247,394

Claims priority, application Japan, Mar. 7, 1988, 63-53262; Jun. 9, 1988, 63-141981

Int. Cl.[4] B23P *15/28*; B22F *7/00*

U.S. Cl. 76—108 R **9 Claims**



1. A method of making drills, endmills and other rotating-and-cutting tools comprising the steps of: extruding super-hard metal powder into a spiral form; and sintering the spiral form, characterized in that it comprises steps of:

forming a ferrous metal powder layer around a part of the sintered spiral form with its spiral groove filled with the ferrous metal powder; and

heating and then cooling the ferrous metal powder layer to form a shank integrally connected to the spiral sintered body, cooling being performed so as to permit the ferrous metal powder layer to solidify with voids appearing inside, not having the inside completely filled up, thereby permitting such voids to absorb any strain, which otherwise, would be caused by the differece between the thermal expansion or contraction of the shank material and that of the sintered spiral body.

4,887,497

BOTTLE CORK REMOVER

Neo Daviddi, 15244 Michigan Ave., Dearborn, Mich. 48126

Filed Dec. 30, 1988, Ser. No. 292,451

Int. Cl.[4] B67B *7/06*

U.S. Cl. 81—3.37 **7 Claims**

1. A bottle cork remover comprising:

a housing that includes a tubular cylindrical side wall having a side opening therein and a first inturned flange at its lower end adapted to seat against the upper edge surface of a bottle, and an axially thickened annular top wall extending across the upper end of the tubular side wall and defining a central space;

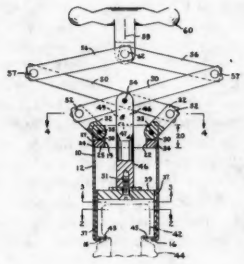
a lifter element that includes a sleeve slideably disposed within the tubular side wall for vertical reciprocatory movement, and a top plate connected to and extending across the upper end of the sleeve within the space circumscribed by the tubular wall; said sleeve having a side opening therein aligned with the side opening in the tubular wall to enable the sleeve to fit around a cork on a bottle; said sleeve having a second inturned flange at its lower end adapted to underlie a cork on a bottle;

a puller shaft connected to and extending upwardly from the

sleeve top plate through the central space defined by the housing top wall so as to be movable with said sleeve;

two aligned radial slots in the upper surface of said axially thickened top wall;

and an external lazy tong mechanism connected to the housing and the puller shaft for applying a magnified manual



force to the lifter element to move the lifter element with respect to said housing;

said lazy tong mechanism comprising two lazy tong links extending into the radial slots in the housing top wall, and pivot pins extending horizontally through the housing top wall and across the radial slots to form pivot connections for the respective lazy tong links.

4,887,498

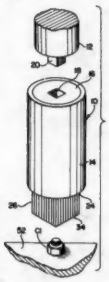
CLAMPING TOOL

Charles Zayat, 100 New Hampshire St., Cranston, R.I. 02920

Filed Oct. 31, 1988, Ser. No. 264,852

Int. Cl.[4] B25B *13/12*

U.S. Cl. 81—185 **18 Claims**



1. A tool for turning components of varying sizes and shapes comprising a housing forming a chamber open at the lower end thereof, a bundle of a plurality of individual pins each having upper and lower ends longitudinally oriented in said chamber in a first normal position with their lower end surfaces adapted to contact the varying size and shape components, said housing having suspension means at the upper end thereof engaging the pin upper ends for suspending said pins in individual slidable relationship to each other where contact of the pin lower end surfaces with the component will force the contacted pins further upwardly into said chamber to a second position and means for returning said pins to their first normal position once contact with the component is removed, said means at the upper end of said housing for suspending said pins being a set of laterally oriented side by side rails positioned across the upper chamber end, said pin upper ends each having a closed end elongated slot through which said rails extend thereby both suspending said pins from said rails and permitting individual longitudinal pin travel as determined by the length of said slots.

4,887,499

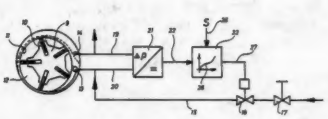
POWER SCREWDRIVER WITH TORQUE LIMITER

Albert Kipfelsberger, Welfenstrasse 7, D-8070 Ingolstadt, Fed. Rep. of Germany

Filed Sep. 28, 1988, Ser. No. 250,836

Int. Cl.[4] B25B *23/51*

U.S. Cl. 81—470 **15 Claims**



1. A power screwdriver having a torque limiter, a drive unit, and a secondary transmission coupled to said driving unit having an output shaft for the attachment of a keyed bit, characterized in that said drive unit includes a pneumatic motor having a compressed-air intake and a compressed-air outlet; a differential pressure measuring unit for measuring the pressure difference between said compressed-air intake and said compressed-air outlet as an indication of the torque produced by the power screwdriver; a comparator unit for comparing said measured pressure difference in the form of an actual pressure value with a preset pressure difference in the form of a set pressure value representing a preset torque value, said comparator unit having a switch output signal; and a switch unit for switching said power screwdriver off when said set value of differential pressure has been reached in response to said switch output signal.

4,887,500

BALL TURNER FOR TURNING LATHES

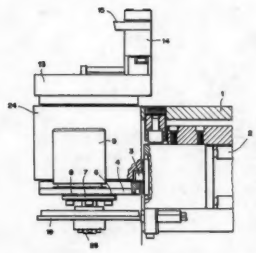
Hans-Jürgen Leiber, Tramelan; Jean-Philippe Meyer, Les Reussilles, and Christian F. Kummer, Tramelan, all of Switzerland, assignors to Kummer Freres SA Fabrique de Machines, Tramelan, Switzerland

Filed Apr. 15, 1988, Ser. No. 182,208

Claims priority, application Switzerland, Apr. 27, 1987, 1597/87

Int. Cl.[4] B23B *5/40*

U.S. Cl. 82—12 **9 Claims**



6. A turning tool driving and adjusting device in a turning machine adapted for machining workpieces of spherical shapes, comprising a base body, a tool support rotatively movable about a vertical axis, motor means for driving said tool support about said axis, a table, means mounting the table on the tool support for movement along an adjustment axis perpendicular to said vertical axis, tool holder means secured to said table, securing means for releasably securing said table to

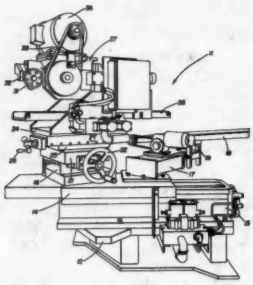
said tool support, adjustment means on said tool support for moving the table on the adjustment axis, means on said tool support and table for releasing said securing means to allow relative movement between said tool support and said table along said adjustment axis, and control means for automatically and sequentially controlling rotative movements of said tool support about said vertical axis and effecting adjusting movements of said table with respect to said tool support along the adjustment axis.

4,887,501

STABILIZER PLY TRIMMER

Donald O. Still, Akron, and George J. Burley, Clinton, both of Ohio, assignors to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Dec. 23, 1982, Ser. No. 452,851
Int. Cl.[4] B23B *5/14*
U.S. Cl. 82—54 **1 Claim**



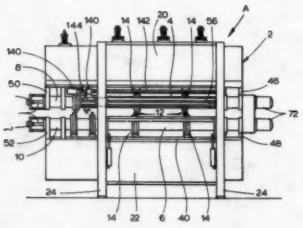
1. In an apparatus for trimming a stabilizer ply disposed on a tire building drum using a rotary cutting element having a sharpened edge for coacting with a fixed surface to form a cutting apparatus, the improvement comprising means for varying the angular relationship of the axis of the cutting edge of said rotary cutting element with respect to the axis of said tire building drum.

4,887,502

MACHINE FOR SLITTING METAL SHEET

Kenneth Voges, Red Bud, Ill., assignor to Red Bud Industries, Inc., Red Bud, Ill.

Filed Dec. 8, 1986, Ser. No. 938,810
Int. Cl.[4] B23D *19/06*
U.S. Cl. 83—479 **32 Claims**



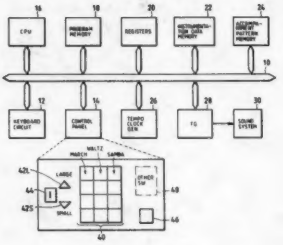
9. A machine for slitting metal sheet, said machine comprising: a frame; first and second powered arbors mounted on the frame for rotation about parallel axes; means coupled to the first and second arbors for rotating the first and second arbors; a first knife on the first arbor and a second knife on the second arbor, the knives being secured to their respective arbors when the arbors turn to slit the metal sheet, but being releasable from their arbors so that they can slide along their arbors; a first storage arbor mounted on the frame where it aligns axially with and normally extends to the first powered arbor, the first storage arbor being the same cross-sectional size and configuration as the first powered arbor so that the first knife can slide onto the first storage arbor, the first storage arbor normally being connected with the end of the first powered arbor to provide radial support for the first powered arbor, but being capable of separating from the first powered arbor so that knives can be removed from the first arbors in the space between the first arbors; and a second storage arbor mounted on the frame where it aligns axially with and normally extends to the second powered arbor, the second storage arbor being the same cross-sectional size and configuration as the second powered arbor so that the second knife can slide onto the second storage arbor, the second storage arbor normally being connected with the end of the second powered arbor to provide radial support for the second powered arbor, but being capable of separating from the second powered arbor so that knives can be removed from the second arbors in the space between the second arbors.

4,887,503

AUTOMATIC ACCOMPANIMENT APPARATUS FOR ELECTRONIC MUSICAL INSTRUMENT

Satoshi Suzuki, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jun. 24, 1988, Ser. No. 211,433
Claims priority, application Japan, Jun. 26, 1987, 62-158919
Int. Cl.[4] G10H *1/06, 1/36, 7/00*
U.S. Cl. 84—613 **4 Claims**



1. An automatic accompaniment apparatus for an electronic musical instrument, comprising:

selecting means for selecting an arbitrary instrumentation from among a plurality of predetermined instrumentations, wherein at least one of the predetermined instrumentations identifies a number of simultaneously producible tones and each of said number of simultaneously producible tones has an associated tone color so that at least said one of the predetermined instrumentations identifies a plurality of musical instruments;

data generating means for generating data representative of each musical instrument in an instrumentation selected by said selecting means and a tone color name of each musical instrument in said instrumentation selected by said selecting means; and

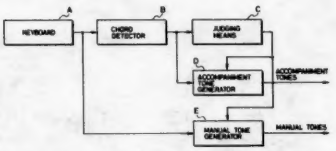
accompaniment tone generating means for setting at least one of the number of simultaneously producible tones corresponding to said number of musical instruments and a tone color corresponding to said tone color name of each musical instrument in accordance with the data derived from said data generating means and for generating an accompaniment tone signal in accordance with its setting contents.

4,887,504

AUTOMATIC ACCOMPANIMENT APPARATUS REALIZING AUTOMATIC ACCOMPANIMENT AND MANUAL PERFORMANCE SELECTABLE AUTOMATICALLY

Eisaku Okamoto, and Yasunao Abe, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Sep. 28, 1987, Ser. No. 101,657
Claims priority, application Japan, Sep. 29, 1986, 61-230913
Int. Cl.[4] G10F *1/00;* G10H *1/00*
U.S. Cl. 84—715 3 Claims



1. An automatic accompaniment apparatus for use in or with an electronic musical instrument, comprising:

a keyboard;

detecting means connected to said keyboard for detecting a chord type based on key-depression signals supplied from said keyboard;

judging means connected to said detecting means for judging whether said detecting means has detected a predetermined chord type;

accompaniment tone generating means connected to said detecting means and to said judging means for generating, when the result of judgment made by said judging means is affirmative, accompaniment tones in accordance with an accompaniment pattern corresponding to the detected chord type; and

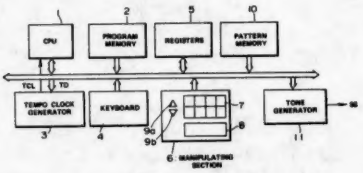
manual tone generating means connected to said keyboard and to said judging means for generating based on said key-depression signals, when the result of judgment made by said judging means is negative, musical tones in accordance with each of the depressed keys, each tone individually corresponding to a respective one of the depressed keys.

4,887,505

ELECTRONIC MUSICAL INSTRUMENT CAPABLE OF PERFORMING AN AUTOMATIC ACCOMPANIMENT

Statoshi Suzuki, Hamamatsu, Japan, assignor to Yamaha Corporation, Shizuoka, Japan

Filed May 17, 1988, Ser. No. 208,381
Claims priority, application Japan, Jun. 26, 1987, 62-159367; Jun. 26, 1987, 62-159368
Int. Cl.[4] G10H *1/06, 1/42, 7/00*
U.S. Cl. 84—714 13 Claims



1. An electronic musical instrument comprising:

(a) tempo signal generating means for generating a tempo signal;

(b) tempo speed control means for controlling a tempo speed of said tempo signal;

(c) pattern generating means for generating pattern data for performing an automatic accompaniment in accordance with said tempo signal, said pattern generating means generating different pattern data in response to a control state of said tempo speed controlled by said tempo speed control means; and

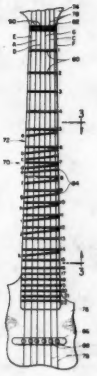
(d) automatic accompaniment tone generating means for automatically generating an accompaniment tone based on said pattern data generated from said pattern generating means.

4,887,506

STRINGED MUSICAL INSTRUMENT WITH MAGNETIC PICKUPS

Mark L. Freed, Santa Monica, Calif., assignor to Noma Video Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 850,257, Apr. 11, 1986, Pat. No. 4,697,492. This application Sep. 29, 1987, Ser. No. 102,486
Int. Cl.[4] G10H *3/18*
U.S. Cl. 84—727 5 Claims



1. In a stringed musical instrument of the electric guitar family of instruments, in combination:

(a) an instrument body including an elongated fingerboard having a front face surface for bearing frets, a headpiece extending upwardly from the fingerboard and a tailpiece extending downwardly from the fingerboard;

(b) a string-supported nut on said fingerboard proximate said headpiece and a string-supporting bridge on said tailpiece;

(c) a plurality of selectively adjustable string tensioning members mounted on said headpiece;

(d) a plurality of strings extending parallel to and above the front face surface of the fingerboard, each string being attached at its upper end to one of said tensioning members, extending over said nut and over said bridge, and being anchored at its lower end to said tailpiece;

(e) a set of primary frets each extending across the fingerboard on the front face surface thereof and positioned in regular sequence along the fingerboard, below and traverse of said strings;

(f) a first magnetic pickup assembly carried by said tailpiece between said bridge and said fingerboard and including a plurality of magnetic pickup heads, each adjacent to and in operative relationship with one of said strings;

(g) a second magnetic pickup assembly incorporated in said nut and including a plurality of magnetic pickup heads, each adjacent to and in operative relationship with one of said strings; and

(h) a set of secondary frets each extending across the fingerboard on the front face surface thereof and positioned between a pair of primary frets along the fingerboard and in off-set non-parallel orientation with respect to said

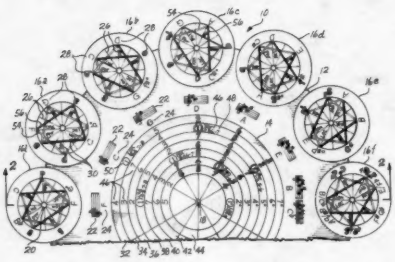
primary frets, each secondary fret being so placed between two primary frets that upon tapping depression of a string of the instrument between and into contact with any adjacent pair of a primary fret and a secondary fret two harmonically resolved musical notes are generated through said string with one of said notes being generated by the string portion between said adjacent air of frets upon which the string is in depressed contact and the bridge and picked up by a pickup head of the first magnetic pickup assembly carried by the tailpiece and the second of said notes being generated by the string portion between said adjacent pair of frets upon which the string is in depressed contact and the nut and picked up by a pickup head of the second assembly incorporated in said nut.

4,887,507

MUSIC TEACHING DEVICE

Terrance Shaw, 4032 N. Whitman, Tacoma, Wash. 98407

Filed Oct. 31, 1988, Ser. No. 265,036
Int. Cl.[4] G09B *15/02*
U.S. Cl. 84—474 **17 Claims**



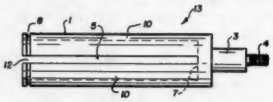
1. A music teaching device, comprising:
a base member having an upper surface
a main wheel member pivotally attached to the upper surface of the base member at a central location;
twelve secondary wheel members each pivotally attached to the upper surface of the base member at circumferential spaced-apart points, radially outwardly from said main wheel member;
indicia on said base member indicating major scale reference notes for each of twelve keys and being circumferentially spaced radially outwardly from said main wheel member, each reference note being associated with one of the secondary wheel members;
said main wheel member being pivotable to selectively align indicia thereon to correspond with major scale reference notes on said base member such that the diatonic order of diatonic notes of a selected key are indicated for each mode of the selected key;
indicia on each of said secondary wheel members radially dividing each said secondary wheel member into twelve equal sections, thereby representing chromatic steps of an octave, and further indicia on each of said secondary wheel members indicating the diatonic notes of a separate one of said twelve keys arranged in order at whole- and half-step intervals in association with the radial divisions; and
each said secondary wheel member being pivotable to selectively associate the tonic note of each mode of the secondary wheel member's separate key with the associated major scale reference note on the base member.

4,887,508

CLEANING AND POLISHING TOOL

Rodolfo Bianco, 560 W. 21st Avenue, Vancouver, British Columbia, Canada V5Z 1Y7

Filed Jul. 18, 1988, Ser. No. 220,170
Int. Cl.[4] F42B *33/02, 35/02, 33/003;* B08B *1/00*
U.S. Cl. 86—23 **10 Claims**



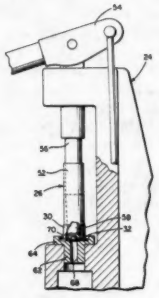
1. A cleaning tool for cleaning the exterior of tubular members comprising:
a tubular body having a longitudinal axis along which a central cavity extends with an open end and a closed end at opposite ends of the longitudinal axis, the side walls of said tubular body having a pair of diametrically opposed slots that cut through said side walls and extend from said open end to adjacent said closed end;
attachment means mounted to the closed end of said tubular body for mounting said cleaning tool to a rotatable drive; and
brush means for insertion into said tubular body comprising a series of brush elements for insertion into said tubular body in a stacked column, each brush element comprising a main body shaped to fit tightly within said tubular body, said main body having a central aperture aligned with said longitudinal axis and outwardly extending projections that fit within said slots in said tubular body and protrude through said side walls to prevent rotation of said main body of said brush element with respect to the tubular body.

4,887,509

SHOTSHELL DIE SET

Robert F. Hodulik, Box 117, RD #3, Hampton, N.J. 08827

Filed Jul. 19, 1988, Ser. No. 221,089
Int. Cl.[4] F42B *33/10, 33/12*
U.S. Cl. 86—36 **7 Claims**



1. A shotshell die set for use with a shell reloading press for removing a spent primer, placing a new primer in place in the shell head, resizing the shell after loading with powder, shot and wadding and crimping the open end of the shell casing, said die set comprising an adaptor for mounting in a press ram hole in the reloading press, said adaptor including an upwardly facing recessed surface receiving the rim of a shotshell case head, said adaptor including a centrally disposed bore extending therethrough sized to permit downward gravitational movement of a spent primer and a depriming pin mounted in

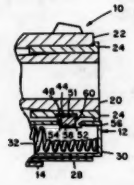
the reloading press for movement downwardly into the open end of a shotshell with the pin including a reduced axial lower end sized to engage a spent primer and push it downwardly out of the primer hole in the shotshell case head and clean and size the primer hole, and a primary pin and adaptor to insert a new primer in the primer hole in the shotshell case head, said adaptor including an upwardly facing surface having a recess therein receiving the rim of the shotshell case head, said adaptor including a bore therethrough sized to engage the rim of a primer but not the anvil of the primer, the recess in the surface of the adaptor being of substantially less height than the height of the primer to enable the primer to be placed in the recess and the shotshell case head engaged with the primer with the primer at least partially inserted into the primer hole, said priming pin including a tapered lower end having a recess therein to receive the portion of the primer inserted through the primer hole and to exert downward force on the interior surface of the shotshell case head peripherally of the primer hole to complete insertion of the primer into the primer hole, the peripheral edge of the recess being upwardly and outwardly inclined to center the rim on the shotshell case head with respect to the adaptor to properly align the primer with the bore through the adaptor thereby assuring proper alignment of the shotshell case head, the adaptor, primer, primer hole and priming pin.

4,887,510

RECOIL LOCKING SYSTEM FOR A FIREARM

Richard R. Wynn, 3600 Lake Crest Dr., SW., Knoxville, Tenn. 37920

Filed Dec. 15, 1988, Ser. No. 284,937
Int. Cl.[4] F41C *21/22, 27/00*
U.S. Cl. 89—163 **4 Claims**



1. In a firearm having a receiver, a barrel slide mounted upon the receiver for reciprocating movement relative thereto between forward and rearward limits of travel, a sleeve-like portion depending from a muzzle end of said slide and reciprocatably received within said receiver, a barrel positioned within the slide, a barrel bushing interposed between the slide and the barrel for movement with the slide during reciprocating movement thereof, a recoil spring connected between the receiver and the slide for urging the slide to its forward limit of travel and a recoil spring plug interposed between the spring and slide so that forces utilized to shift the slide toward its rearward limit of travel are transferred from the slide to the recoil spring and wherein the recoil spring plug is movable forwardly and rearwardly to a limited extent relative to the slide between a rearward position at which disassembly of the firearm is facilitated and a forward position, the improvement comprising:

means defining an aperture that extends transversely of and fully through said slide,

said aperture being disposed at a junction of said sleeve-like portion and the muzzle end of said slide,

means defining a slot extending transversely of said barrel bushing and opening outwardly of an outer circumference of said bushing,

means defining a further slot extending transversely of said recoil spring plug and opening outwardly of an outer circumference of said plug,

lockplate means adapted to be received in said aperture, said lockplate comprising

elongated body portion of generally rectangular cross-section,

means defining a first arcuate cutout disposed centrally of a length of said lockplate and in one side thereof,

means defining a second arcuate cutout disposed concentrically of said first output, of larger radial dimension than said first output, and extending less than fully through a full dimension between opposite surfaces of said lockplate, whereby there is defined an arcuate shoulder between said cutouts,

said lockplate, when disposed in said aperture, receiving in said first cutout a portion of said recoil spring with said spring being slidable with respect to said lockplate so that said lockplate does not interfere with compression or expansion of said recoil spring, and receiving in said second cutaway one edge of said further slot defined in said recoil spring plug,

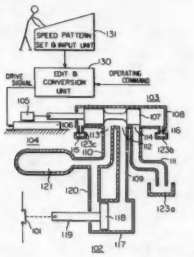
a side edge of said lockplate opposite said first arcuate cutout being substantially linear and being received in said slot defined in said barrel bushing, thereby releasably interconnecting said recoil spring plug and said barrel bushing one to another for simultaneous reciprocation of the recoil spring plug and the barrel bushing with said slide and its sleeve-like portion in response to firing of said firearm.

4,887,511

HYDRAULIC CONTROL VALVE APPARATUS

Tsutomu Sugiyama, and Toshiaki Yoshizumi, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 863,730, May 16, 1986, abandoned. This application May 12, 1988, Ser. No. 195,398
Int. Cl.[4] F15B *13/16*
U.S. Cl. 91—361 **7 Claims**



1. A hydraulic operating apparatus connected to a circuit interrupter having a contact comprising a hydraulic cylinder driving said contact and hydraulic control valve means for controlling supply of a fluid through fluid passages to said hydraulic cylinder in response to closing and interrupting commands, thereby closing and interrupting said contact, and a position control motor connected to position a valve member of said hydraulic control valve means, said hydraulic operating apparatus having means for converting input information concerning a desired speed control pattern of the interrupter into an electrical signal for driving said motor according to the closing and interrupting commands, the signal provided from said converting means being transmitted to said motor such that the displacement of said motor causes the valve member of said hydraulic control valve means to be positioned to connect the fluid pasages to selectively drive said hydraulic cylinder in different directions, and such that the valve member of said hydraulic control valve means is positioned at an intermediate

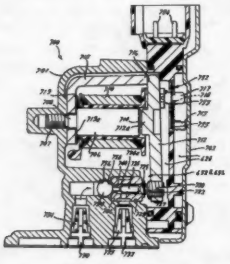
position different from final stop positions respectively corresponding to an interruption or closed state of the contact to provide a throttle effect in said hydraulic control valve means, thereby controlling the speed of said hydraulic cylinder to provide the desired speed control pattern to the interrupter.

4,887,512

VENT RESERVOIR IN A FLUID SYSTEM OF AN AUTOMATIC TRANSMISSION SYSTEM

Maurice B. Leising, Clawson, and Uno Kuusik, Royal Oak, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 187,705
Int. Cl.[4] F15B *1/00*
U.S. Cl. 91—471 **6 Claims**



1. A fluid system in a vehicle transmission including pump means for supplying fluid flow from a fluid source to at least one predetermined fluid actuating device in the transmission, the predetermined fluid actuating device having a vent, and a plurality of passageways in a housing interconnecting said pump means and the predetermined fluid actuating device of the transmission to allow fluid flow therethrough, said system comprising:

vent means for automatically venting unwanted gases within the passageways and for maintaining a predetermined level of fluid above the vent of the predetermined fluid actuating device.

4,887,513

BRAKE CYLINDER WITH BAYONET CONNECTION

Jürgen Ewald, Laatzen; Josef Frania, and Roland Glogowschek, both of Hanover, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Continuation of Ser. No. 937,757, Dec. 4, 1986, abandoned. This application Sep. 26, 1988, Ser. No. 249,146
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1985, 3543365
Int. Cl.[4] F01B *7/00*
U.S. Cl. 92—63 **28 Claims**

1. A brake cylinder, said brake cylinder comprising:

(a) a cylindrical housing portion;

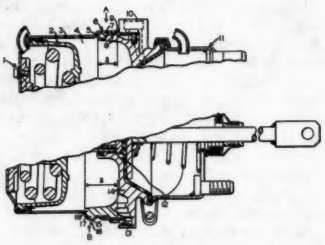
(b) a cylindrical base portion connected to said housing portion, said base portion including a portion projecting axially into said housing portion, which forms an axial overlapping region with said housing portion;

(c) a brake piston positioned for reciprocal movement within said housing portion;

(d) a pressure chamber bordered on one side by said brake piston, and on the other side by said base portion;

(e) a circular sealing element positioned in said overlapping region to seal off said pressure chamber;

(f) said housing portion and said base portion being joined together by a bayonet connection, and formed in said overlapping region by one of at least one radial projections and at least one radial recess in said housing portion and, respectively, a complementary radial projection and a complementary radial recess in said base portion; and



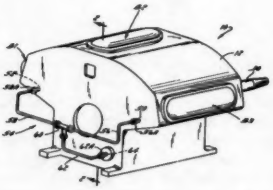
(g) said bayonet connection being axially positioned on a pressure side of said circular sealing element, whereby said seal permits the maintaining of a positive pressure on said bayonet connection.

4,887,514

OIL SEPARATION AND GAS PRESSURE EQUALIZER MEANS FOR RECIPROCATING GAS COMPRESSOR

Robert J. Schintgen, New Berlin, Wis., assignor to Vilter Manufacturing Corporation, Milwaukee, Wis.

Filed Nov. 18, 1988, Ser. No. 273,242
Int. Cl.[4] F15P *21/04;* F01B *31/18*
U.S. Cl. 92—79 **10 Claims**



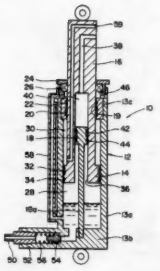
1. In a reciprocating gas compressor having a housing which is divided by a partition member therein into an upper suction chamber through which gas passes and a lower crankcase chamber in which a component moves along a path, said suction chamber having a location whereat oil collects and said crankcase chamber having an oil sump wherein oil collects;

conduit means externally connected between said suction chamber and said crankcase chamber to enable oil collected at said location in said suction chamber whereat oil collects to flow by gravity through said lower crankcase chamber clear of said path and into said oil sump, to enable gas to flow in either direction between said suction chamber and said crankcase chamber to equalize gas pressure between the chambers and to enable oil droplets in said gas to flow by gravity through said conduit means and through said lower crankcase chamber clear of said path and into said oil sump.

4,887,515
HYDRAULIC CYLINDER APPARATUS

Masaaki Tabata, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Sep. 21, 1988, Ser. No. 247,374
Claims priority, application Japan, Sep. 29, 1987, 62-242680
Int. Cl.[4] F01B *31/00*; F15B *21/00*
U.S. Cl. 92—80 **4 Claims**



1. A hydraulic cylinder apparatus which is used by connecting an external pressure source with extension- and contraction-side liquid chambers defined by a cylinder, a piston sliding in the cylinder and a piston rod integral with the piston, comprising:

seal members provided with said extension- and contraction-side liquid chambers respectively and formed to enable liquid to leak through clearances between the seal members and the parts disposed opposite to the seal members;

a first receiving chamber connected to a reservoir tank for receiving liquid leaked from at least one of said extension and contraction-side liquid chambers, the receiving chamber being formed so as to change its volume with the movement of said piston rod;

a second receiving chamber for receiving liquid leaked from said contraction-side liquid chamber; and

a check valve disposed between said first receiving chamber and the reservoir tank to allow liquid to flow from the first receiving chamber and to the reservoir tank;

wherein said piston rod extends through the second receiving chamber and projects outwardly of the cylinder apparatus through a seal means for preventing liquid from leaking from the cylinder, and wherein said second receiving chamber is connected to piping to the reservoir tank at a downstream side of the check valve.

4,887,516
CLAMPING ARRANGEMENT FOR DIAPHRAGM PISTON ASSEMBLY

Daniel G. Scott, Swissvale, and Theodore B. Hill, North Versailles, both of Pa., assignors to American Standard Inc., Wilmerding, Pa.

Filed Sep. 13, 1988, Ser. No. 243,943
Int. Cl.[4] F01B *19/02*; F16J *3/02*
U.S. Cl. 92—98 D **9 Claims**

1. A diaphragm clamping arrangement for mounting a diaphragm piston in a valve body comprising:

(a) a fluid pressure operated piston member disposed in said valve body with an annular space therebetween for axial movement in opposite directions to an application position and a release position;

(b) an annular diaphragm member fixed at its inner periphery to said piston member;

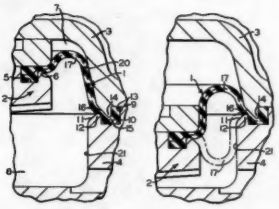
(c) said body including first and second sections between which the outer periphery of said diaphragm is clamped;

(d) first and second pressure chambers formed between said diaphragm piston and said first body section and between said diaphragm piston and said second body section respectively;

(e) a convolution of said diaphragm formed in said annular space, said convolution having a preferred direction of formation in which said convolution is disposed when said piston member is moved toward said application position in response to a first pressure differential between said first and second pressure chambers, said convolution being inverted from said preferred direction of formation when said piston member is moved toward said release position in response to a second pressure differential between said first and second chambers;

(f) said first section including:

(i) a first clamping face;



(ii) an annular clamping groove recessed in said first clamping face in which said outer periphery of said diaphragm member is contained; and

(iii) a first annular clamping bead projecting from said clamping groove; and

(g) said second section including:

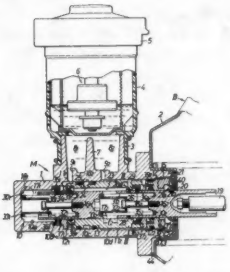
(i) a second clamping face adjoining said first clamping face; and

(ii) an annular bevel surface of said second clamping face spaced opposite said first annular clamping bead such that said diaphragm adjacent said outer periphery is forced by said first clamping bead into engagement with said bevel surface, said bevel surface being inclined in a direction corresponding to said preferred direction of formation of said convolution.

4,887,517
MASTER CYLINDER WITH PISTON RETAINER

Takayoshi Shinohara, Ueda, Japan, assignor to Nissin Kogyo Kabushiki Kaisha, Ueda, Japan

Filed Jan. 26, 1988, Ser. No. 148,515
Claims priority, application Japan, Mar. 6, 1987, 62-51374; Mar. 16, 1987, 62-60838; Mar. 23, 1987, 62-68197
Int. Cl.[4] F16J *15/18, 10/04*
U.S. Cl. 92—128 **9 Claims**



7. A master cylinder comprising:

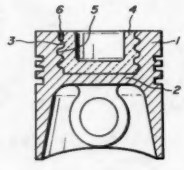
a cylinder body having a cylinder bore;
a plunger inserted in said cylinder bore;
a bearing secured to a rear end of said cylinder body to slidably support said plunger;
a sleeve fitted in said cylinder bore adjacent to and in front of said bearing, said plunger being slidably received in said sleeve;
stopper means for defining a retreat limit for said plunger, said stopper means being provided between said sleeve and said plunger, said stopper means comprising a stopper wall integrally formed on said sleeve, a stopper ring mounted over an outer periphery of said plunger and capable of abutting against said stopper wall, and said sleeve being provided with an axial groove extending on an inner peripheral surface thereof, and a rear end of said axial groove being closed by said stopper wall.

4,887,518

INTERNAL COMBUSTION ENGINE PISTON WITH THREADED CERAMIC PISTON HEAD

Isse Hayakawa, Nagoya, Japan, assignor to NGK Insulators, Ltd., Nagoya, Japan

Continuation of Ser. No. 800,862, Nov. 22, 1985, abandoned. This application May 2, 1988, Ser. No. 191,731
Claims priority, application Japan, Dec. 5, 1984, 255806
Int. Cl.[4] F02F *3/00*; F02B *23/06*; F16J *1/01*
U.S. Cl. 92—212 **16 Claims**



1. A piston comprising:
a ceramic piston head having a continuous male thread portion formed on substantially an entire outer peripheral portion of the ceramic piston head, said thread portion consisting of rounded threads having a substantially uniform radius of curvature;
a metal piston body including an inner peripheral portion which forms a depression in a top portion of the metal piston body, said depression having a sufficient volume to encompass the entire ceramic piston head, said inner peripheral portion including a continuous female thread portion for mating with the male thread portion said female thread portion consisting of rounded threads having a substantially uniform radius of curvature; and
a rotation restraining means for restraining the piston head from rotatably turning with respect to the piston body, wherein a ratio of the height of the male and female thread portions to the pitch thereof is from $\frac{1}{4}$ to $\frac{1}{2}$.

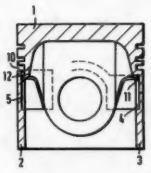
4,887,519

EXPANSION-CONTROLLED LIGHT ALLOY PISTON

Werner Steidle, Bad Friedrichshall, Fed. Rep. of Germany, assignor to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed Mar. 19, 1986, Ser. No. 841,632
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511557
Int. Cl.[4] F16J *1/04*
U.S. Cl. 92—228 **7 Claims**

1. An expansion-controlled light alloy piston for internal combustion engines, particularly for diesel engines, comprising at least one plate-like or strip-like expansion control element with peripheral parallel pins, which comprises steel and is bonded with its outside, lower side and upper side to an inside peripheral surface of carrying portions of a skirt of the piston and is embedded with coaxial edges in cast hubs of piston pin eyes, and which on that portion which is adjacent to the piston heat is covered on the inside by an embedding inner bead, which extends between the hubs of the piston pin eyes o a level which is spaced above the lower end of the expansion control element by 10 to 50% of the height of said element, wherein the expansion control element has on both sides of the plane of



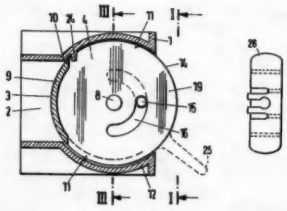
oscillation of the connecting rod, an aperture which is open toward the lower end of the skirt and extends over a peripheral length of more than 10% and up to 60% of the piston diameter and has an axial height amounting to 30 to 85% of the height of the expansion control element and terminates at or short of the beginning of the embedding inner bead and further comprising projections which comprise the piston material and extend over at least part of the width of said aperture and protrude into the latter and serve to support those edges of the expansion control element which define the aperture.

4,887,520

AIR OUTLET DEVICE

Karl-Heinz Bauer, Bad Neustadt, Fed. Rep. of Germany, assignor to Preh, Elektrofeinmechanische Werke Jacob Preh, Nachf. GmbH & Co., Bad Neustadt, Fed. Rep. of Germany

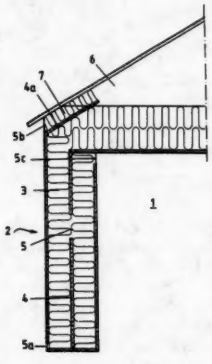
Filed Mar. 7, 1988, Ser. No. 164,838
Claims priority, application Fed. Rep. of Germany, Mar. 7, 1987, 3707397
Int. Cl.[4] F24F *13/10*
U.S. Cl. 98—2 **7 Claims**



3. An air outlet device for a vehicle passenger compartment ventilation system, comprising:
a housing body having an air passage opening and first and second opposing sidewalls;
a closure flap of part-circular cross-section pivotably mounted on the housing to be tiltable about a pivot axis located downstream from the closure flap, the pivot axis corresponding to the center of curvature of the closure flap;
an actuating part arranged on the closure flap and mounted on the first sidewall so as to pivot about the pivot axis, said actuating part having a slot formed therein;
a first journal formed on said first sidewall which extends through the slot formed in the actuating part, said slot having ends which form stops for movement of the closure flap;

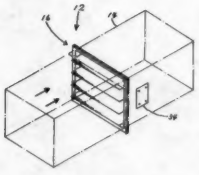
a second journal formed on said second sidewall; and
an air guide louver mounted on the first and second journals.

4,887,521
METHOD FOR ARRANGING OF VENTILATION OF BUILDING AND STRUCTURE FOR APPLYING OF THE METHOD
Reino Miettinen, Siilinjärvi, 70900 Toivala, Finland
PCT No. PCT/FI86/00066, § 371 Date Mar. 2, 1987, § 102(e) Date Mar. 2, 1987, PCT Pub. No. WO87/00260, PCT Pub. Date Jan. 15, 1987
PCT Filed Jun. 26, 1988, Ser. No. 34,154
Claims priority, application Finland, Jul. 3, 1985, 852623
Int. Cl.[4] F24F *12/00*
U.S. Cl. 98—31 8 Claims



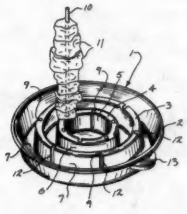
1. A method for ventilating a building wherein the air pressure within the building is different than the air pressure outside of the building, comprising:
(a) passing air through an orifice defined on one side of an external wall of the building exposed to ambient atmosphere into a space defined within the wall;
(b) directing the air within the wall in a direction that is parallel to an inner surface of the external wall through insulation materials within the wall by using directing materials which extend parallel to the inner surface of the external wall and have an air permeability of zero to low relative to said insulation materials, thereby filtering the air and providing heat exchange between the air and the wall; and
(c) passing the air so filtered through an orifice defined in the opposite side of the wall whereby the filtered air is closer in temperature to the temperature of the insulation materials than was heretofore possible because the air is constrained by the directing materials to move heightwise along the wall prior to exiting same.

4,887,522
AIR-CONDITIONING APPARATUS
Toshio Kuno; Yoshikazu Shindo; Yukio Kuno; Takeshi Ueno, all of Fukuoka; Akira Torimi, Saga, and Yoji Mori, Fukuoka, all of Japan, assignors to Kabushiki Kaisha Kyoritsu, Oaza Wada, Japan
Filed Apr. 20, 1988, Ser. No. 184,013
Claims priority, application Japan, May 22, 1987, 62-77574[U]; Jul. 16, 1987, 62-178648; Sep. 8, 1987, 62-137868[U]; Sep. 26, 1987, 62-147426[U]; Oct. 19, 1987, 62-160641[U]; Feb. 10, 1988, 62-29338
Int. Cl.[4] F24F *13/14*
U.S. Cl. 98—40.2 6 Claims



1. An air-conditioner apparatus for adjusting the direction and quantity of air, comprising:
a duct means for providing an air guiding passage extending through said duct means;
an airflow adjusting means for adjusting a flow of air, fitted to said duct means across said air guiding passage and made from a single thin plate;
slits of predetermined patterns formed on said airflow adjusting means; and
a plurality of vanes defined with said slits and formed integral to said airflow adjusting means, each vane having first slit segments defining opposed sides of the vane and second slit segments defining other opposed sides of the vane and slit-discontinued portions disposed in the center of said first slit segments such that said vane is adjustable around said slit-discontinued portions to optional angles.

4,887,523
SHISH-KAKOB COOKING DEVICE
Willard J. Murphy, and Shirley G. Murphy, both of Highway 25, Box 642, Monticello, Minn. 55362
Filed Mar. 24, 1988, Ser. No. 173,172
Int. Cl.[4] A47J *37/04*
U.S. Cl. 99—419 9 Claims



1. A cooking dish construction for supporting a food product in an auxiliary heating apparatus, comprising a dish including a base and having a ridge extending upwardly from said base, trough means disposed above said base and laterally of said ridge, said ridge having at least one vertical hole having a closed bottom, drain passage means extending laterally of the axis of said hole through said ridge and providing communication between said hole and said trough means, and a skewer

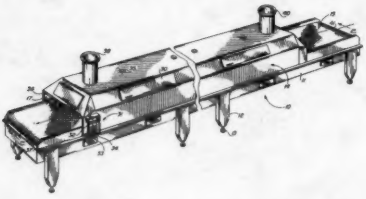
freely disposed within said hole and containing a food product whereby drippings from said food product will flow downwardly along said skewer to said hole.

4,887,524

SHRIMP COOKING APPARATUS

Roy Ellis-Brown, Maitland, Fla., assignor to International Seafood Engineering, Inc., Miami, Fla.

Filed Apr. 11, 1988, Ser. No. 182,301
Int. Cl.[4] A23L *3/00*
U.S. Cl. 99—443 C 6 Claims



1. A shrimp cooking apparatus comprising:
a frame;
a motor driven endless belt conveyor having a porous endless belt supported on the frame;
a housing covering a portion of the porous belt and supporting on said frame, said housing having an entrance thereinto and an exit therefrom;
a steam feed pipe connected to a source of steam at on end thereof;
steam manifold means connected to said steam feed pipe and extending beneath the surface of the porous endless belt, said steam manifold means having a plurality of openings therein to release steam under said porous endless belt, whereby shrimp on said endless belt have heat and pressure applied thereto by the release of steam thereunder;
a plurality of solenoid valves connected to said steam manifold means to control the release of steam from said steam manifold means;
cooling means for cooling the shrimp exiting the housing to stop the cooking of the shrimp;
sensing means for sensing the heat in said housing whereby shrimp can be cooked to a predetermined degree; and
said housing having a raised portion forming a raised chamber and said endless belt conveyor having a raised portion in said housing raised chamber to thereby lift shrimp in the housing into the raised chamber and to lower the shrimp to exit the housing, said endless conveyor belt raised portion extending substantially horizontal over a predetermined length in said raised chamber so as to maintain said shrimp in the raised chamber under elevated temperature and pressure for a predetermined length of time.

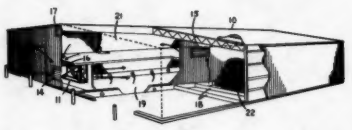
4,887,525

APPARATUS FOR APPLYING SPROUT INHIBITOR TO STORED POTATOES

Charles R. Morgan, 4659 Enterprise St., Boise, Id. 83705

Division of Ser. No. 193,051, May 12, 1988. This application Dec. 9, 1988, Ser. No. 281,982
Int. Cl.[4] A23B *7/00*
U.S. Cl. 99—476 2 Claims

1. In a potato storage facility having an air supply plenum, a fan and a fan motor, an apparatus for applying a sprout inhibiting chemical to the stored potatoes which comprises:
means for reducing turbulence and the air flow in the air supply plenum below 5 standard cubic feet per minute per ton of potatoes stored therein;
means for atomizing a sprout inhibiting chemical;



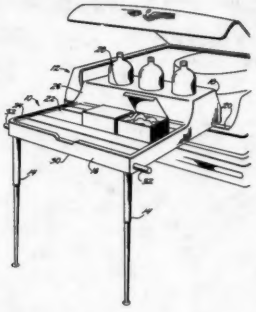
means for introducing the atomized chemical into the air supply plenum of the potato storage facility.

4,887,526

AUTOMOBILE TRUNK TABLE

Brian L. Blatt, 3808 Kilbourne Hill Rd., Columbia, S.C. 29206

Filed Mar. 14, 1989, Ser. No. 323,430
Int. Cl.[4] A47B *37/04*
U.S. Cl. 108—44 16 Claims



1. A table used in combination with an automobile having a trunk with a trunk floor and a trunk rim, said table comprising:
an upper surface for holding objects having a front portion and a back portion, said upper surface laterally supporting said objects when said upper surface is not level;
a lower surface opposite said upper surface;
means for supporting said front portion attached to said lower surface, said supporting means including at least one leg, said leg having a folded position against said lower surface and a supporting, unfolded position; and
a ramp means for removing said upper surface from said trunk floor by raising said front portion from said trunk floor to said trunk rim, said upper surface carried by said ramp means.

4,887,527

MAGNETIC BEAM FOR A ROLLER SQUEEGEE OF A ROTARY SCREEN PRINTING INSTALLATION

Gerardus H. van Mondfrans, Sambeek, and Jacobus F. M. Peters, Ottersum, both of Netherlands, assignors to Stork Brabant B.V., An Boxm Eer, Netherlands

Filed Oct. 6, 1988, Ser. No. 254,184
Claims priority, application Netherlands, Oct. 9, 1987, 8702420
Int. Cl.[4] B41L *13/04*
U.S. Cl. 101—116 12 Claims

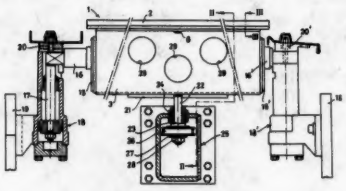
1. A magnetic beam for a roller squeegee of a rotary screen printing installation having a conveyor conveying articles for a printing operation and a frame including a plurality of stops to

prevent excessive movement of the beam and a vertically movable member adjusting a height comprising:

an elongated upper plate, whose longitudinal direction is perpendicular to a direction of advance of the conveyor

a plurality of magnet coils disposed on an underside of said upper plate and energized electrically,

a lower container connected to said upper plate and extending over virtually the entire length of the upper plate and surrounding the magnet coils and having openings for natural ventilation along the magnet coils, and



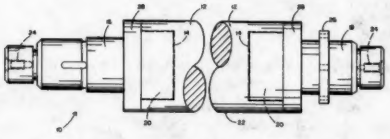
a projecting journal disposed at each end of the beam and resting on the vertically movable member and which interacts with the adjustable stop connected to the frame of the printing installation, wherein said upper plate is connected to the lower container in a manner such that the upper plate can expand freely in the longitudinal direction with respect to the lower container and is fixed in the direction of movement of the conveyor belt with respect to the lower container.

4,887,528

DAMPENING SYSTEM ROLLER FOR OFFSET PRINTING PRESSES

Arthur A. Ruge, Stone Mountain, and Donald A. Kenagy, Atlanta, both of Ga., assignors to Ceradyne, Inc., Costa Mesa, Calif.

Filed Oct. 31, 1988, Ser. No. 264,374
Int. Cl.[4] B41L *23/04, 25/02*
U.S. Cl. 101—148 **5 Claims**



1. An improved dampening system roller of the type used in an offset printing press for picking up a film of water and transferring it to the plate cylinder; the improvement comprising:

a solid cylinder made of fused silica and having recesses in the axial ends thereof, said fused silica being impregnated throughout its entire volume by a silicone resin; and

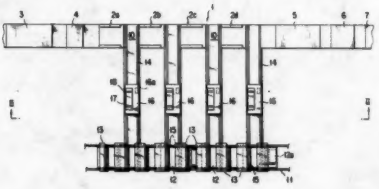
a pair of end member inserts bonded to said cylinder recesses for connecting said roller in said press.

4,887,529

INTERCHANGEABLE DRUM UNIT INTERCHANGE SYSTEM

Haruo Ichikawa, 4-16-9, Higashi-Koiwa, Katsushika-ku, Tokyo; Ryoichi Kanno, 1-22-4, Maihara-nishi, Funabashi-shi, Chiba-ken, and Masato Nakatsukasa, 14-40-415, Bamba 3-chome, Ohtsu-shi, Shiga-ken, all of Japan

Filed Sep. 21, 1988, Ser. No. 247,232
Claims priority, application Japan, Sep. 25, 1987, 62-239051
Int. Cl.[4] B41F *5/06*
U.S. Cl. 101—181 **3 Claims**



1. An interchangeable drum unit interchange system in an interchangeable drum type rotary printing machine installation, comprising a printing line in which a plurality of rotary printing machines, respectively having interchangeable drum units mounted thereon in an interchangeable manner, are aligned in a one row printing line, a pair of rack truck rails are laid in parallel to said printing line, a self-propelled rack truck on said rack truck rails, a plurality of sets of interchange trucks rails extending from interchangeable drum unit positions intermediate said rotary printing machines on said printing line towards said rack truck rails and substantially at right angles to said printing line and said truck rails, a self-propelled interchange truck on each set of said interchange truck rails for reciprocation on said interchange truck rails for transferring said interchangeable drum units, and interchangeable drum unit reloading means provided on said rack truck for unloading used drum units and reloading new interchangeable drum units between said printing machines, said interchange trucks and said rack truck, said interchangeable drum unit reloading means includes means for moving said rack truck on said rack truck rails to an interchange position for interchanging said drum units, a plurality of stands erected on said rack trucks at an interval equal to one-half of the interval between adjacent ones of said respective rotary printing machines for selectively placing new and used interchangeable drum units thereon, and a plurality of sets of on-truck rails laid on said rack truck between said respective stands so as to correspond to said respective interchange truck rails and for alignment therewith.

4,887,530

WEB REGISTRATION CONTROL SYSTEM

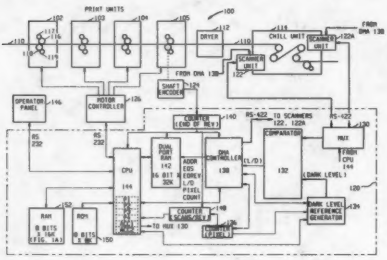
Jeffrey W. Sainio, Hartland, Wis., assignor to Quad/Tech, Inc., Pewaukee, Wis.

Filed Apr. 7, 1986, Ser. No. 849,095
Int. Cl.[4] B41F *5/06*
U.S. Cl. 101—181 **42 Claims**

1. A system for generating indicia of registration error between respective, separately adjustable printing units of a printing press, said printing units cooperating to print an image on a moving web, said image including at least one registration mark printed by each of said printing units, said registration marks being of predetermined shape and, when said printing units are registry, having a predetermined relative disposition on said web, the system being of the type comprising photo-optical means, having a field of view, for generating output signals indicative of markings on said web passing through said field of view in predetermined relation to said photo-optical means as said web moves in relation to said printing units, and processing means, responsive to said photo-optical means

output signals, for generating signals indicative of deviations of the registration marks printed by said printing units from said predetermined relative disposition; improved wherein:

said photo-optical means has a field of view comprising a plurality of nominal cells, and comprises means for generating signals indicative of markings on said web in successive scans of a predetermined number of respective cells disposed along a line transverse to the direction of web



movement as said web passes in predetermined relation to said photo-optical means;

said registration marks being disposed on said web to come within said predetermined number of cells and darkening a plurality of said cells during a plurality of said scans; and

said processing means includes means for determining the cells which said registration marks darken in said successive scans.

4,887,531

INTERCHANGEABLE DRUM UNIT TYPE ROTARY PRINTING MACHINE

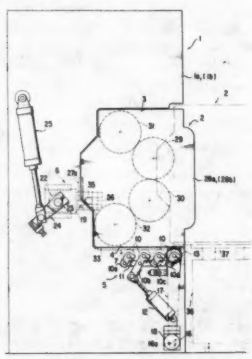
Haruo Ichikawa, Tokyo; Ryoichi Kanno, and Masayuki Kiyomiya, both of Chiba, all of Japan, assignors to Miyakoshi Printing Machinery Co., Ltd., Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,762

Claims priority, application Japan, Nov. 6, 1987, 62-169015[U]

Int. Cl.[4] B41F *5/00*

U.S. Cl. 101—216 **4 Claims**



1. An interchangeable drum unit type rotary printing machine comprising: a rotary printing machine body having an approximately U-shaped longitudinal interchangeable drum unit mounting portion formed substantially in the intermediate part of the front of the rotary printing machine body and having a pair of left and right body frames spaced apart with each body frame on one side thereof, the arrangement being such that an interchangeable drum unit having a plurality of transversely extending blanket and plate cylinders supported between a pair of left and right interchangeable drum unit frames spaced apart with each drum unit frame on one side thereof is mounted transversely in the mounting portion so that it may be replaced with another interchangeable drum unit; an interchangeable drum unit adapted to be mounted in said interchangeable drum unit mounting portion; a pair of left and right interchangeable drum unit moving devices mounted on said left and right body frames adapted to move an interchangeable drum unit resting on an interchangeable drum unit carriage located in close proximity to the front of said printing machine body into said mounting portion formed in the printing machine body and to move an interchangeable drum unit mounted in said mounting portion onto said carriage; and a pair of left and right interchangeable drum unit fixing devices for fixedly securing an interchangeable drum unit inserted in said mounting portion to the printing machine body.

4,887,532

A STOP MOTION DEVICE FOR A WEB FEED PRINTING PRESS

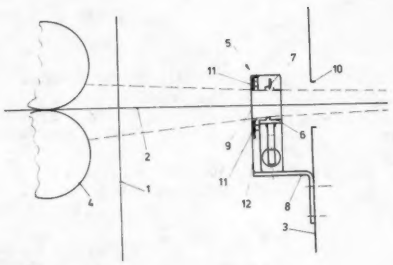
Werner J. Kotterer, Diedorf, Fed. Rep. of Germany, assignor to Grafotec Kotterer GmbH, Diedorf, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,064

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1987, 3740812; Jul. 2, 1988, 3822497

Int. Cl.[4] B41F *13/56*

U.S. Cl. 101—225 **14 Claims**



1. A stop motion device for a web feed printing press, comprising:

a printing unit defining a delivery side from which a web is delivered out of the printing unit;

web interrupting means located on the delivery side of said printing unit, said web interrupting means having a slot for the passage of the web, the web defining a trouble-free operation plane between the printing unit and the web interrupting means; and

at least one web tear detector switch connected to said web interrupting means and adapted to respond to contact with the web when the web is free of tension and angularly displaced relative to the trouble-free operation plane, caused by a tear in the web.

4,887,533

APPARATUS AND METHOD FOR OSCILLATING THE FORM ROLLERS IN A PRINTING PRESS

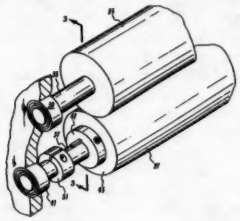
Milton R. Lemaster, Dallas, and Norman H. Kemp, Hurst, both of Tex., assignors to AirSystems Inc., Dallas, Tex.

Continuation of Ser. No. 909,898, Sep. 22, 1986, Pat. No. 4,777,877, which is a continuation-in-part of Ser. No. 858,944, May 2, 1986, Pat. No. 4,718,344. This application Oct. 5, 1988, Ser. No. 253,776

The portion of the term of this patent subsequent to Jan. 12, 2006, has been disclaimed.

Int. Cl.[4] B41F *1/16*

U.S. Cl. 101—492 18 Claims



1. A method for controlling the application of ink to the printing plate in a lithographic printing press, comprising the steps of:

providing ink distribution means for transferring ink from an ink source to the ink-receptive areas of the printing plate, said ink distribution means including a first vibrating roller and a plurality of ink form rollers disposed between first vibrating roller and being in contact with both the first vibrating roller and the plate;

providing dampening roller means for transferring dampening fluid from a fluid source to the ink-rejecting areas of the printing plate, said dampening roller means including a second vibrating roller and a dampening form roller disposed between the second vibrating roller and the plate and being in contact with both the second vibrating roller and the plate;

rotating the first vibrating roller about its major axis and moving said first vibrating roller in an oscillating manner along its major axis to transfer ink to the ink form rollers;

allowing at least two of said ink form rollers to rotate and move axially along with said first vibrating roller so that said ink form rollers apply a relatively uniform coating of ink to said printing plate;

rotating said second vibrating roller about its major axis and moving said vibrating roller in an oscillating manner along its major axis to transfer dampening fluid to said dampening form roller; and

allowing said dampening form roller to rotate and move axially along with said second vibrating roller to dissipate ink picked up from said printing plate by said dampening form roller across the surface of said dampening form roller.

4,887,534

IGNITION SYSTEM FOR HIGH INTRUSION PROJECTILE

Thomas E. Dickovich, Minneapolis, and Steven P. Neubauer, Maple Grove, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 10, 1988, Ser. No. 204,814

Int. Cl.[4] F42B *5/02, 5/16, 13/10*

U.S. Cl. 102—373 17 Claims

1. An ammunition round comprising:

(I) a projectile (10), said projectile (10) including

(a) a warhead (12);

(b) a boom (14) and fin assembly (16) formed rearwardly of said warhead (12), said boom (14) and fin assembly (16) having an axial bore (18, 26, 27) formed in the rearward end thereof; and

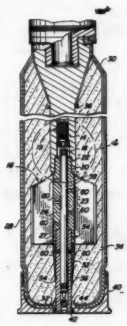
(II) a cartridge assembly, said cartridge assembly including

(a) an external cartridge case (28) containing a loose granular propellant (34), said boom (14) and fin assembly (16) and a portion of said warhead (12) being positioned in said external cartridge case (28) and surrounded by said granular propellant (34);

(b) a base assembly (40) sealingly engaging the rear end of said external cartridge case (28); and

(c) a primer (54) extending fo-wardly from said base assembly (40), said primer (54) including

(i) a stub flash tube (56), said tube flash tube (56) having a forward end, said forward end being slidably re-



ceived in said axial bore (27) in said boom (14) and fin assembly (16) to provide support for said boom (14) and fin assembly (16) and to increase the radial stiffness of said ammunition round, said stub flash tube (56) also comprising a plurality of transversely extending flash holes (60) communicating with the interior of said external cartridge case (28);

(ii) an elongated igniter cartridge (58) positioned within said flash tube (56) and extending through said axial bore (18, 26, 27) in said boom (14) and fin assembly (16), said igniter cartridge (58) being formed from paper and being filled with strands of benite; and

(iii) a fill tube (52) secured to the rear end of boom (14) and fin assembly (16) to facilitate smooth and uniform pouring of said granular propellant (34) into the external cartridge case (28) during loading.

4,887,535

RAIL-HIGHWAY SEMI-TRAILERS

Angelo Mangone, Matera, Italy, assignor to Ferrosud S.p.A., Matera, Italy

Filed Mar. 28, 1988, Ser. No. 174,397

Claims priority, application Italy, Jan. 20, 1988, 2102 A/88

Int. Cl.[4] B61D *17/20*

U.S. Cl. 105—3 20 Claims

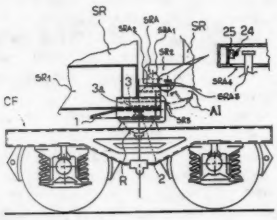
1. An interface for a semi-trailer comprising:

a beam disposable between a rail truck and semi-trailer providing a recess open through one side of said beam for receiving a bar mounted on a transverse beam of the semi-trailer;

hemispherical center-bearing counter-element means rigidly attached to said beam, for coupling said beam to a center pin socket of the rail truck;

slidingly engaging elements attached to said beam for supporting said beam on sliding surfaces of the rail truck; and

means connected to said beam for retaining the bar of the semi-trailer in engagement with said recess;



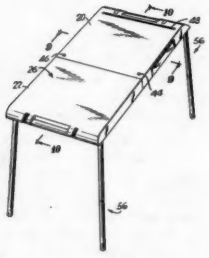
whereby said beam, counter-element and slidingly engaging elements are rotatable 180° about a vertical axis of said center pin.

4,887,536

SELF-CONTAINED, COLLAPSIBLE DEMONSTRATION TABLE WITH A BACKBOARD, FOR USE IN PRODUCT DEMONSTRATIONS

Marshall I. Teichner, Chicago, Ill., assignor to Minatur Promotions and Enterprises, Ltd., Chicago, Ill.

Filed Jul. 1, 1988, Ser. No. 214,315
Int. Cl.[4] A47B *3/87*
U.S. Cl. 108—35 **5 Claims**



1. A self-contained, collapsible demonstration table with a backboard which can be conveniently changed manually between a closed, suitcase-like structure that is easily stored and carried and a table with a large table top and an upstanding display backboard, comprising:

a housing having first and second shells each of which has a hinge side and a free side separated from each other by a table portion having an inner side and an outer side;

a shell hinge securing the hinge sides of said shells to each other to allow the shells to pivot between an open position in which the outer sides of said table portions thereof form a substantially flat table top and a closed position in which the shells form a closed, suitcase-like package in which the inner sides of said table portions are spaced from each other to enclose an interior space;

two leaves each having a hinge end and a free end;

a leaf hinge securing the hinge ends of said leaves to each other to allow the leaves to pivot between an open position in which said leaves form a display backboard and a folded position in which said leaves are folded flat against each other;

a backboard engaging means at said housing for detachably securing said backboard in a display position in which said backboard extends up from said table top;

a leaf engaging means at said housing for engaging said leaves when in their folded position to support them against the table portion of one of said shells when the shells are in their closed position;

leg engagement means at the inner side of each of said shells;

at least three legs each of which comprises an upper and a lower section which are secured to each other and to a respective leg engagement means by a respective resilient means which urges the respective leg sections and leg supporting means toward each other such that when the respective leg sections and leg engagement means are aligned the two sections of each leg detachably interfit to form a leg and the legs detachably interfit with the respective leg engagement means to thereby support said table and such that said legs can be detached from said leg engagement means and the sections of each leg can be detached from each other by hand against the urging of said resilient means;

leg section braces at the inner side of each of said shells to detachably secure said leg sections flat against the inner sides of said shells when the leg sections are detached from each other;

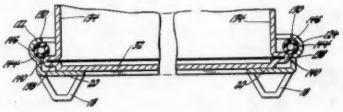
wherein said closed, suitcase-like package can be conveniently converted manually to a demonstration table with an upstanding display backboard by the steps of manually detaching the leaves, pivoting the shells to their open positions to form said table top, and detaching said leg sections from said braces and interfitting them with each other and with said leg engagement means to form table legs supporting the table top and pivoting the leaves to form said backboard and securing the backboard to said backboard engaging means, and wherein said table and backboard can be collapsed to form said closed, suitcase-like package by carrying out said steps in reverse order.

4,887,537

SHOCK RESISTANT STORAGE BIN AND PALLET ASSEMBLY

George E. Kellogg, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 4, 1985, Ser. No. 697,971
Int. Cl.[4] B65D *19/44*
U.S. Cl. 108—55.1 **5 Claims**



1. A transportable storage mechanism having a pallet and a storage device mounted on said pallet and shock absorbent means resiliently securing said pallet and said storage device together to isolate said storage device from transport impact by absorbing horizontal plane shock, said mechanism more specifically comprising:

said storage device having a substantially horizontal bottom and side means defined by panel means secured to said bottom and extending upwardly therefrom to form a container in which goods may be stored and transported, and flange-like retention means extending outwardly of said container adjacent said bottom;

said pallet having a substantially horizontal frame section receiving said container bottom thereon in supporting relation, leg means appropriately spaced on the underside of said frame section and supporting said frame section and said container in a raised position, said leg means providing horizontal and vertical clearance under said frame section for suitable lifting and transporting means such as the forks of a forklift to extend thereunder and lift said storage mechanism and any goods therein, said pallet further having raised lip-like means formed on said frame section and extending in spaced relation about said con-

tainer horizontally above said retention means but vertically clear thereof so as to permit said container to be moved vertically onto and from said pallet when said shock absorbent resilient securing means are not in place, said lip-like means cooperating with said retention means to define keyway-like space means extending substantially horizontally about said container;

said shock absorbent resilient securing means being resilient key means received in said keyway-like space means after said container is placed on said pallet frame section in supporting relation, said shock absorbent resilient securing means substantially surrounding said container in shock absorbing resilient engaging relation with said container and said pallet raised lip-like means and sufficiently filling said keyway-like space means to cooperate with said lip-like means and said flange-like retention means to resiliently but positively lock said pallet and said container together to provide the transportable storage mechanism;

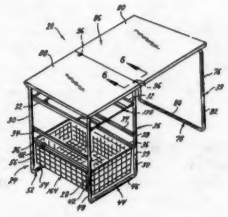
said lip-like means having at least one discontinuous section permitting insertion and removal of said shock absorbent resilient securing means.

4,887,538

MODULAR OFFICE FURNITURE SYSTEM

William D. Arnold, St. Louis, Mo., assignor to Lee-Rowan Company, St. Louis, Mo.

Filed Oct. 12, 1988, Ser. No. 256,452
Int. Cl.[4] A47B *3/00*
U.S. Cl. 108—111 **6 Claims**



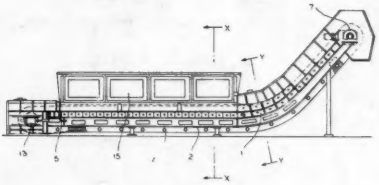
6. A modular office furniture system comprising a desk having a front and rear and having first and second side assemblies, the first side assembly comprising front and rear vertical tube sections each having a top and a bottom, the front vertical tube sections being connected to the rear vertical tube sections by vertically spaced upper and lower pairs of horizontally opposed channel runners, front and rear cross tubes each having a horizontal section for resting on a floor and having upstanding leg sections contiguous with the horizontal section, the upstanding leg sections of the front and rear cross tubes being telescopingly joined to the bottoms of the front and rear vertical tube sections, respectively, a forward horizontal straight tube extending between and connected to the tops of the front vertical tube sections, a rearward horizontal straight tube extending between and connected to the tops of the rear vertical tubes, a forward curved support tube having a horizontal section telescopingly fitted to the forward horizontal straight tube, a rearward curved support tube having a horizontal section telescopingly fitted to the rearward horizontal straight tube, the forward and rearward curved support tubes having forward and rearward vertical sections, respectively, a cross tube having a front to rear extending horizontal section for resting on a floor and having upwardly extending front and rear legs, the front leg of the cross tube being telescopingly fitted to the forward vertical section of the forward curved support tube and the rearward leg of the cross tube being telescopingly fitted to the rearward vertical section of the rearward curved support tube, a desk top, and means connecting the desk top to the horizontal straight tubes and the horizontal sections of the curved support tubes, a file holder frame having side members adapted to slidingly fit within a selected pair of the horizontally opposed channel runners and being adapted to support a plurality of file folders, and a basket having side members spaced and adapted to fit between a selected pair of horizontally opposed channel runners.

4,887,539

PROCESS AND APPARATUS FOR CONTINUOUS DRY REMOVAL OF BOTTOM

Mario Magaldi, Viale dei Bosco, 22, I-84100, Salerno, Italy, assignor to Mario Magaldi, Salerno, Italy

PCT No. PCT/EP87/00012, § 371 Date Jan. 10, 1986, § 102(e) Date Jan. 10, 1986, PCT Pub. No. WO87/04231, PCT Pub. Date Jul. 16, 1987
PCT Filed Jan. 8, 1987, Ser. No. 120,493
Claims priority, application Italy, Jan. 10, 1986, 19052 A/86
Int. Cl.[4] F23J *1/00*
U.S. Cl. 110—165 R **10 Claims**



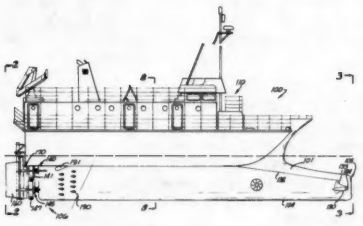
1. A system for continuously removing bottom ash from a fire bed, said system comprising a first and flexible conveyor belt made of high temperature resistant material trained over a drive drum with a friction fit therebetween, a plurality of overlapping load bearing plates loosely joined to said conveyor belt for bearing the weight of a load deposited on said belt, whereby temperature caused expansion and contraction of said conveyor belt is absorbed by said plates sliding relative to each other in said overlap area, and a tightly sealed envelope means surrounding said conveyor belt in order to retain heat of said fire bed while enabling said ash to be conveyed out of a furnace in which said fire bed is located.

4,887,540

WATERCRAFT PROPULSION SYSTEM

Calvin A. Gongwer, 19017 E. Leadora Ave., Glendora, Calif. 91740

Filed Jun. 30, 1988, Ser. No. 213,994
Int. Cl.[4] B63B *1/00*
U.S. Cl. 114—57 **12 Claims**



1. A propulsion system comprising

a first means for generating propulsion and

a second means for generating propulsion,

said first propulsion means being mounted at the rear of a craft above said second propulsion means such that the

centerlines of said first and second propulsion means are substantially aligned;

a moveable rudder mounted substantially vertical at the rear of the craft along the centerline of and in the effluent streams of said first and second propulsion means;

a fixed fin array mounted at the rear of the craft in the effluent streams of said first and second propulsion means ahead of said rudder;

said fixed fin array comprising a vertical fin and a first and second horizontal fin; said vertical fin is mounted substantially parallel to said rudder between said first and second propulsion means and said rudder; said first horizontal fin is mounted substantially perpendicular to said rudder in the effluent stream of said first propulsion means and said second horizontal fin is mounted substantially perpendicular to said rudder in the effluent stream of said second propulsion means.

4,887,541

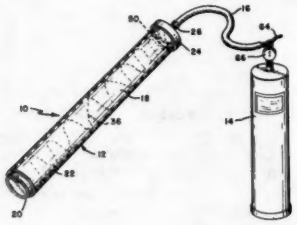
DEPLOYABLE FLOTATION DEVICE

Will B. Rodemann, 522-B Iroquois La., Oronoque Village, Stratford, Conn. 06497

Filed Mar. 24, 1988, Ser. No. 172,445

Int. Cl.[4] B63C *9/02*

U.S. Cl. 114—68 **12 Claims**



1. A deployable buoyancy device for marine vessels comprising a tubular container, means for mounting the container in a fixed location within a marine vessel, a buoyancy member folded and inserted in collapsed condition within the container, the buoyancy member having an inner inflatable buoyancy bag formed of multiple elastomeric layers and an outer protective cover as a separate independent layer shaped around the inner buoyancy bag, the outer layer of the inner buoyancy bag being of smaller size than succeeding inner layer(s) and the outer protective cover being of smaller size than the inner buoyancy bag to reduce shear and improve tear strength of the buoyancy member, inflation means for admitting inflating medium into the buoyancy bag, means for connecting the inflation means to a source of inflation medium, and means for inflating the buoyancy member and for ejecting the same from the container into a compartment of the marine vessel to provide buoyancy.

4,887,542

DEVICE FOR AUTOMATICALLY SECURING A HOIST

Claude Piveteau, Anse, France, assignor to Wichard, Societe Anonyme of France, Thiers, France

Filed Oct. 3, 1988, Ser. No. 252,532

Claims priority, application France, Oct. 2, 1987, 87 14144

Int. Cl.[4] B63H *9/08*

U.S. Cl. 114—108 **2 Claims**

1. A device for the automatic securing in the hoist position of the head of a sail of a sailing vessel on a mounting integrally formed with the mast, said device comprising:

a body of elongated shape, said body having a first end and a second end;

said first end having a means for securing a sail;

a rod projecting from said second end of said body;

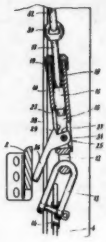
said rod provided with a ring to secure a halyard for handling the sail;

said rod formed integrally with a piston mounted to slide axially in said body, said piston subjected to the action of a spring adapted and constructed to push said piston in the direction of said first end of said body and to engage a hook;

said body also including a part which is open at the side thereof and in communication with a bore in which said piston is mounted;

said hook having at least one arm mounted in said part in such manner as to pivot about a transverse axis and an outer branched which projects outwardly from said body;

said hook comprising, in the portion of said hook located inside said body, and on the portion thereof engaged by



said piston, a flat surface adapted and constructed to support the end of said piston, forming with the axis of the arm of the hook an angle supplementary to that angle formed by said branch with the body in the hooked position;

said flat surface being delimited on the side of the arm of said hook projecting outwardly by a shoulder which is substantially at right angles to said arm, said shoulder being extended by a ramp in the general shape of an arc of a circle;

said one arm of said hook shaped so that when said piston is engaged against said hook, said outer branch of said hook is blocked in its rotation in relation to said body and forms with this an acute angle on the side of said first end of said body so that when said piston is withdrawn it can pivot freely and form an obtuse angle with said body.

4,887,543

UNFORGETTABLE UMBRELLA METHOD

Sondra Rockhill, 15 Bunting Ave., Burlington, N.J. 08016

Filed Mar. 9, 1989, Ser. No. 321,208

Int. Cl.[4] A45B *25/30*

U.S. Cl. 116—201 **14 Claims**

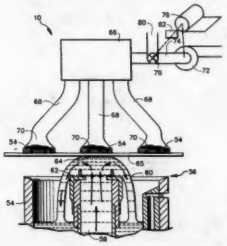
1. A method to aid the memory in remembering to retrieve an umbrella upon leaving a building from a location where the umbrella was placed upon entrance to the building, the method comprising:

(a) providing an eye means with an opening to receive a clip means, on a handle of the umbrella,
(b) providing a member having a perceptible surface with a clip means to detachably attach onto the eye means,
(c) providing identification means on the umbrella and on the member to visually indicate that umbrella and the member go together,
(d) attaching the member to the eye means on the umbrella,
(e) removing the member by detaching it from the umbrella upon entering a building,
(f) placing the umbrella at the location where the umbrella is to be temporarily left in the building, and
(g) attaching the member to a key ring on which automobile or residence door keys presently in use are attached,
wherein the member is of sufficient size and shape that it will be readily noticeable when the keys are next used.

4,887,544
VACUUM WELL PROCESS

Patrick O. Nunally, Diamond Bar, Calif., assignor to General Dynamics Corp., Pomona Div., Pomona, Calif.

Filed Mar. 14, 1988, Ser. No. 167,940
Int. Cl.[4] C23C *14/00*
U.S. Cl. 118—50 **10 Claims**



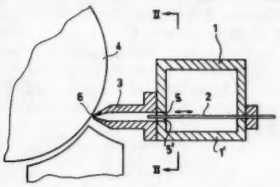
1. An apparatus for micro miniature feedthrough coupling of a substrate having an upper and a lower planar side and having micro through holes, said apparatus comprising:
means for supporting said substrate;
means for applying a continuous quantity of molten solder to only said lower planar side of said substrate; and
means for applying a vacuum to said upper planar side of said substrate directly opposite said molten solder while it is applied to said lower planar side of said substrate, said vacuum forcing a quantity of said molten solder into said through holes for filling said through holes with a quantity of said molten solder.

4,887,545
AIR KNIFE

Mauri Soininen, Naantali, Finland, assignor to Valmet Paper Machinery Jylhavaara OY, Valkeakoski, Finland

Filed Jun. 16, 1988, Ser. No. 207,648
Int. Cl.[4] B05C *3/12*
U.S. Cl. 118—63 **3 Claims**

1. An air knife for removing excess coating from a surface of a web, comprising:
wall means defining a main air channel;
first blowing means for blowing air into said main air channel in a first axial direction along said channel;
second blowing means for blowing air into said main channel in a second axial direction along said channel and opposite said first direction
a partition dividing said main air channel into first and second axially tapering parts, said first part receiving air blowing in said first axial direction and said second part receiving air blowing in said second axial direction, said first and second parts each axially tapering from widest to narrowest in a downstream direction of said air blowing in said respective part;
an axially extending air slit formed between said partition

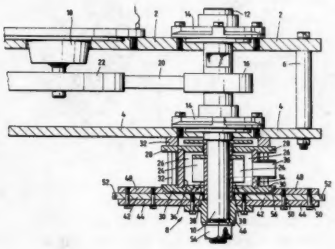


and said first and second parts of said channel defining means for blasting air from said first and second parts of said channel toward a surface of a web perpendicularly to said first and second axial directions.

4,887,546
LINING OF BORE HOLES

Benjamin Mason, Newark, Great Britain, assignor to Caledonian Mining Co. Ltd., Great Britain

Filed Nov. 25, 1987, Ser. No. 125,125
Claims priority, application United Kingdom, Dec. 3, 1986, 8628883
Int. Cl.[4] B05B *3/10*
U.S. Cl. 118—306 **5 Claims**



1. Apparatus for spraying cement on the walls of a bore hole, said apparatus comprising
a spray head comprising
an annular chamber into which cement is fed from a supply source elevated above said spray head,
plural blades positioned within said chamber, said blades being rotatable to re-mix said cement within said chamber,
means connected with said blades to rotate said blades at a relatively high speed, that rotation speed being sufficient to limit the outlet pressure of said cement from said chamber to a desired substantially constant value relative to the changing head pressure of said cement as delivered to said chamber when said supply source is located substantially above said spray head and as the distance between said apparatus and said supply source increases,
an annular outlet for exhausting cement from said chamber, and
a rotatable spray disc arranged to receive cement from said annular outlet, said spray disc being adapted to distribute said cement substantially evenly over the internal surface of said hole because the outlet pressure of said cement from said chamber remains substantially constant regardless of the vertical location of said spray head beneath said supply source, said rotatable spray disc comprising

a support plate,

plural radially extending spray bars mounted on said plate, and

a second wider bar mounted on top at least the outer end portion of each spray bar, thereby forming a channel on each side of each spray bar,

means to move said head through said bore hole, said head being connected to said move means, and

means for delivering cement to said head, said delivery means being connected to said head and to said supply source.

4,887,547

APPARATUS FOR CONTINUOUSLY APPLYING A UNIFORM COATING TO A MATERIAL WEB

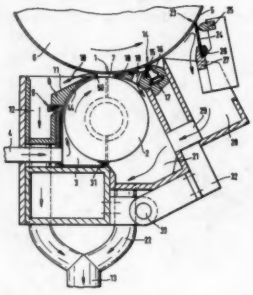
Herbert Sommer, Düsseldorf, and Hans Rückert, Ratingen, both of Fed. Rep. of Germany, assignors to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 893,068, Aug. 1, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 183,322

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1985, 3527379

Int. Cl.[4] B05C *3/02*

U.S. Cl. 118—410 **7 Claims**



1. In an apparatus for continuously applying a uniform coating of material to a web, comprising means for applying coating material including a back roller over which the web travels, a coating roller for the coating material drawing liquid from a liquid chamber and spaced apart from the back roller to form a coating gap, and means disposed downstream of the applying means and separate therefrom for metering the coating on the web, the improvement wherein the coating roller draws in liquid on one side and comprises a guide plate on said side extending into the coating gap between the coating roller and the back roller and wherein at least in a region facing the coating gap between the coating roller and the back roller, the guide plate is curved to correspond to the periphery of the coating roller.

4,887,548

THIN FILM MANUFACTURING SYSTEM

Kazuo Urata; Naoki Hirose, and Shigenori Hayashi, all of Atsugi, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

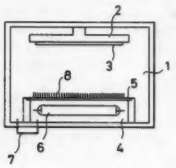
Filed May 13, 1988, Ser. No. 193,680

Claims priority, application Japan, May 15, 1987, 62-118600

Int. Cl.[4] C23C *16/48*

U.S. Cl. 118—722 **3 Claims**

1. A thin film manufacturing system comprising a reaction vessel with a window that is transparent to ultraviolet radiation, exhaust means for exhausting gas from the reaction vessel to a reduced pressure condition, introduction means for introducing a gas into the reaction vessel to form a thin film, a source of ultraviolet radiation that activates the gas, and reduction means for reducing build up of the thin film on the window that is transparent to ultraviolet radiation, the reduction means comprising a plurality of spaced vertical plates disposed



on the window that are transparent to ultraviolet radiation to form slits therebetween that are transparent to ultraviolet radiation.

4,887,549

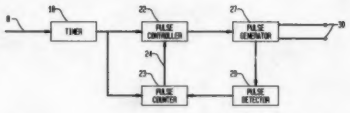
DOG TRAINING APPARATUS

Mark A. Powell, Buda, Tex., assignor to Texmark Enterprises, Inc., Manchaca, Tex.

Filed Jan. 6, 1989, Ser. No. 295,069

Int. Cl.[4] A01K *15/00*

U.S. Cl. 119—29 **8 Claims**



1. A dog training apparatus mounted on a dog collar, comprising:

means for detecting a dog's bark and producing an electrical signal in response thereto;

means responsive to the electrical signal from the bark detecting means for producing voltage pulses across a pair of electrodes in order to impart a shock to a dog;

means for detecting the occurrence of a pulse across the electrodes;

means for inhibiting the pulse producing means from producing further pulses for a predetermined automatic delay period after a pulse has been detected; and

wherein the pulse detecting means counts the number of the pulses produced across the electrodes and the pulse inhibiting means prevents further pulses from being produced for a predetermined automatic delay period after the pulse count has reached a predetermined value and further wherein the pulse producing means produces pulses with a voltage between 25,000 and 60,000 volts for durations no more than three microseconds.

4,887,550

TROLLEY FOR DISTRIBUTING FEED INTO A RECTILINEAR TROUGH IN A POULTRY FARM

Camillo Pirovano, 22052 Cernusco, Lombardone, Como, Italy

Filed Mar. 28, 1988, Ser. No. 174,341

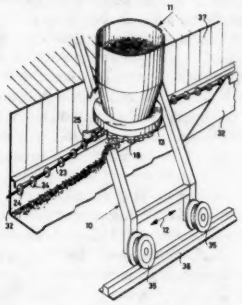
Claims priority, application Italy, Apr. 23, 1987, 20222 A/87

Int. Cl.[4] A01K *39/014*

U.S. Cl. 119—56.2 **7 Claims**

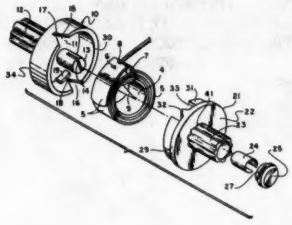
1. Travelling trolley-plus-container for distribution of feed into a channel-shaped rectilinear trough, in bird breeding establishments, of the type cooperating with a stationary wire rope carrying interspaced disks to which can be applied removable, shutter-type sleeves in order to cause controlled release, through a delivery mouth, of successive doses of feed at pre-set points of the bird breeding establishment a toothed

wheel to which said wire rope is coupled fixed to a rotor with radial vanes between which the feed arrives by free fall, the



said rotor being housed within a matching seat which is provided at the base of the said container and which features the said delivery mouth.

4,887,551
RETRACTABLE LEASH
Louis J. Musetti, 480 Hoffman Ave., Monterey, Calif. 93490
Continuation-in-part of Ser. No. 887,538, Jul. 21, 1986, Pat. No. 4,692,977, and a continuation-in-part of Ser. No. 750,501, Jul. 1, 1985, abandoned. This application Dec. 7, 1987, Ser. No. 129,594
The portion of the term of this patent subsequent to Jun. 7, 2005, has been disclaimed.
Int. Cl.[4] A01K *1/00*
U.S. Cl. 119—109 **21 Claims**



1. A leash comprising a cable, means for fastening said cable to the device on which it is to be used, a hollow handle assembly having a coiled leaf spring therein, a cylindrical band enclosing said leaf spring, said leaf spring having its outermost end fixedly attached to said cylindrical band and its innermost end attached to a cylindrical shaft of the handle asembly, a bar positioned between the outermost coil of said spring and said cylindrical band, said bar being held only by the pressure between the outermost coil of said spring and said cylindrical band, said cable being fixedly attached to said bar and said spring coiling up around said cylindrical shaft when said cable is unwound and said cable tending to be rewound around said cylindrical band by the spring action of said spring.

4,887,552
ELECTRICALLY LIGHTED LEASH
James T. Hayden, 3154 Exon St., Cincinnati, Ohio 45241
Filed Oct. 5, 1988, Ser. No. 253,669
Int. Cl.[4] A01K *1/00*
U.S. Cl. 119—109 **6 Claims**

1. An illuminatable leash for a pet animal, said leash comprising,

a flexible, transparent hollow tube having a central passage which extends longitudinally through it,

said tube having two longitudinal ribs extending along opposite sides of a relatively thicker center portion between them, said passage being presented in said center portion,

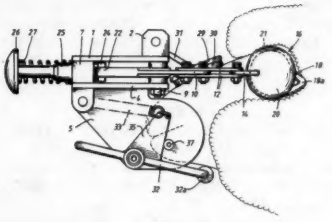
a series of small electric lights connected to insulated wires and disposed along said passage, said lights spaced apart along said passage,

said tube having one end which is looped back and secured to itself, to form a hand-holdable loop,

said tube extending through a slip eye at a second end thereof, to provide a choker-type collar, and

a battery and a switch for selectively supplying power to said wires to illuminate said lights.

4,887,553
ANIMAL HEAD RESTRAINT
James P. Trevelyan, Nedlands, and Andrew M. Whitehead, Heathridge, both of Australia, assignors to The University of Western Australia, Nedlands, Australia
Filed Aug. 11, 1988, Ser. No. 231,012
Claims priority, application Australia, Aug. 11, 1987, PI3695
Int. Cl.[4] A01K *29/00*
U.S. Cl. 119—154 **10 Claims**



1. A head restraint for an animal comprising:

a support structure;

upper and lower jaw engaging means mounted on nsaid support structure;

a pair of arms pivotally mounted on said support structure, each of said arms including a free end from which a lug projects, said lug being positioned to engage a depression in the animal's skull structure, said depression being located between an eye socket and an ear of the animal, when the jaw engaging means are engaged with upper and lower jaws of the animal; and

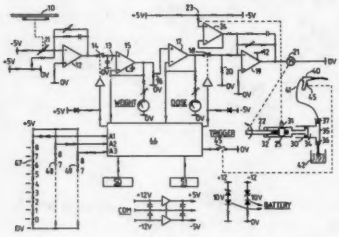
means for pivoting said arms so as to engage said skull depressions and for holding said arms with said lugs in engagement with said depressions, whereby the head of the animal is firmly restrained by combined action of said upper and lower jaw engaging means and the lugs engaging said skull depressions.

4,887,554

ANIMAL DRENCH

Darryl R. Whitford, Rosedale, South Australia, 5350, Australia

Filed May 23, 1988, Ser. No. 197,460
Claims priority, application Australia, May 27, 1987, PI2201
Int. Cl.[4] A61D 7/00
U.S. Cl. 119—159 6 Claims



1. An animal drenching device, comprising:

animal support means, a weight responsive transducer at least partly supporting the weight of an animal,

a drenching handpiece having a discharge tube, a drench dosage pump comprising a piston/cylinder assembly wherein said piston slidably and sealably engages said cylinder, a piston rod carried by the piston, a nut on the piston rod, a screw thread threadably engaging the nut, a hose between the drenching handpiece and the dosage pump,

an electric motor having a rotary shaft coupled to said screw thread to move the piston axially within the cylinder upon motor operation to force a dosage of drenching chemical to and through the discharge tube of the drenching handpiece, a switch on the drenching handpiece,

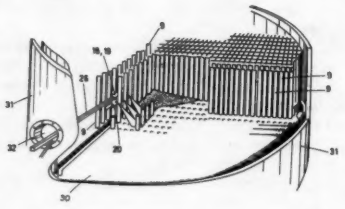
an electrical circuit interconnecting the transducer, switch and motor, the electrical circuit comprising amplifier means which amplify a transducer signal responsive to increase of weight imposed on the transducer, said amplified signal driving the motor, the electric circuit also comprising regulating means which control said motor drive to limit said dosage in response to said weight increase.

4,887,555

ARRANGEMENT FOR CLEANING A STEAM GENERATOR WITH A WATER JET

Carlo Smet, Zwanendreef 32, 2360 Oud-Turnhout, Belgium

PCT No. PCT/BE87/00012, § 371 Date Mar. 25, 1988, § 102(e) Date Mar. 25, 1988
PCT Filed Jul. 28, 1987, Ser. No. 180,977
Claims priority, application Belgium, Jul. 29, 1986, 0/216991
Int. Cl.[4] F22B 37/54; F28F 15/00
U.S. Cl. 122—382 18 Claims



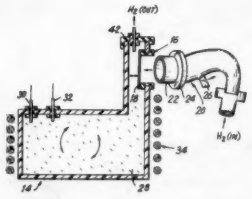
1. Arrangement for cleaning with a water jet, a steam generator fitted with a bundle of pipes (9) which lie inside a space formed by an upstanding casing, whereby said space is further bounded by a bottom plate and said casing has adjacent said bottom plate, a plurality of observation holes wherethrough at least one spray-lance (1–3) may be let in and further slipped in the space between the pipes (9) proper, to remove by means of said water jet the iron oxide deposited on said pipes (9) and over said bottom plate, characterized in that it is formed by at least one, but preferably a plurality of, for example three spray-lances (1–3) which are received adjacent the spray-head (6) thereof with outflow opening, in a common bearing (7), in such a way that they lie in operating condition, in a vertical plane and the water jet from said lances (1–3) is rotatable from the vertical plane over an angle of +85° and −85° at the most, because each spray-lance (1–3) is mounted with the one end thereof on a common rotatable component (10) which simultaneously comprises a connector (16) for supplying the high-pressure water, which component (10) has inner channels (12–14) wherethrough the high-pressure water flows from said connector (16) in said spray-lances (1–3), whereby said spray-lances (1–3) are rotatably connected to a positioning pin (4), which is rotatable about the lengthwise axis thereof and which is lockable with the head (17) thereof between two vertical pipes.

4,887,556

ARRANGEMENT FOR AND METHOD OF SUPPLYING HYDROGEN GAS

Ernest Gladstone, 721 Avenue O, Brooklyn, N.Y. 11230

Filed Feb. 8, 1989, Ser. No. 307,535
Int. Cl.[4] F02B 75/12
U.S. Cl. 123—1 A 11 Claims



1. An arrangement for supplying hydrogen gas as a fuel, comprising:

a lightweight, compact storage tank having an interior, an inlet for introducing hydrogen gas at supra-atmospheric pressure into the interior, and an outlet for discharging the pressurized hydrogen gas from the interior of the tank;

a multitude of hydrogen-collecting host materials in the interior, for adsorbing the pressurized hydrogen gas on outer surfaces of the host materials;

pressure sensor means for detecting the pressure of the pressurized hydrogen gas within the interior of the tank, and for generating a control signal when the detected pressure is below a predetermined threshold during use; and

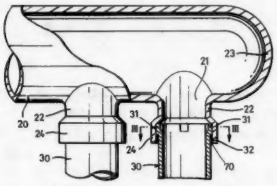
stirrer means responsive to the generation of the control signal, for stirring the host materials to release hydrogen gas adsorbed thereon.

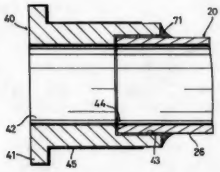
4,887,557

PROCESS FOR PRODUCING AN INTAKE MANIFOLD

Minobu Sukimoto; Katsumi Yamazaki; Naohisa Hirunuma; Seijiro Taguchi; Tadashi Usui; Yasushi Akiyoshi; Toyoichiro Nogami, and Toyoji Kaneko, all of Osaka, Japan, assignors to Showa Aluminum Corporation, Osaka, Japan

Division of Ser. No. 65,461, Jun. 23, 1987, Pat. No. 4,829,944.
This application Nov. 15, 1988, Ser. No. 271,269
Claims priority, application Japan, Jun. 25, 1986, 61-150596; Sep. 30, 1986, 61-234095; Sep. 30, 1986, 61-234096; Mar. 24, 1987, 61-69388; Apr. 22, 1987, 62-99262; Apr. 24, 1987, 62-102299
Int. Cl.[4] F02M *35/10*
U.S. Cl. 123—52 MC 5 Claims





1. A process for producing an intake manifold comprising the steps of:

preparing a main pipe made of wrought aluminum material and having an open end and a closed end opposite to the open end and a plurality of branch pipes made of wrought aluminum material and having opposite open ends,

forming in the peripheral wall of the main pipe holes equal in number to the number of the branch pipes,

forming outward tubular projections integrally with the peripheral wall individually around each of the holes, the tubular projections being identical with the branch pipes in inside diameter,

forming an enlarged tubular portion at the forward end of each of the tubular projections, the enlarged tubular portion having an inside diameter larger than the outside diameter of the branch pipes,

forming on the outer peripheral surface of one end of each branch pipe a plurality of outer protuberances equal in projection height and arranged at a spacing circumferentially thereof so that when said one end of the branch pipe is fitted in the enlarged tubular portion, the protuberances are in contact with the inner peripheral surface of the enlarged tubular portion to form a brazing material retaining clearance between the inner peripheral surface and the outer peripheral surface, and

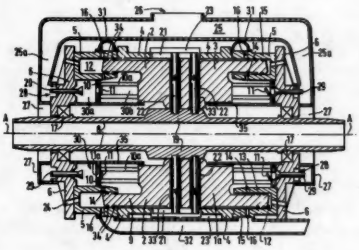
fitting said one end of each branch pipe into the enlarged tubular portion in alignment therewith and joining said one end to the enlarged tubular portion by brazing.

4,887,558

INTERNAL-COMBUSTION ENGINE HAVING OPPOSED INTEGRAL ANNULAR PISTONS AND A CENTRAL SHAFT

Esparbes Bernard, Hautes-Pyrénées, France, assignor to Aerospatiale Societe Nationale Industrielle, Societe Anonyme, Paris Cedex, France

Filed Feb. 23, 1988, Ser. No. 159,266
Int. Cl.[4] F02B *75/26*
U.S. Cl. 123—58 C 11 Claims



1. Internal-combustion engine, comprising at least one driving shaft (8), driven in rotation by at least one engine assembly which the shaft penetrates coaxially (AA) (8), and which comprises a cylindrical housing (4), each axial end of which is integral with one of two hollow and annular cylinders (5), open towards each other and each closed by a base (5*a*) on the opposite side, and two annular pistons (2,3) guided in axial translation in the housing (4) in which they are fitted opposed, so that each of them exhibits a piston head (9) engaged to slide fluid-tightly in axial reciprocation each in one of the two annular cylinders (5), in each of which an annular combustion chamber (12) is delimited between the corresponding cylinder base (5*a*) and the piston head (9), each combustion chamber (12) being supplied by an admission system (10, 30, 29, 28, 25) for a comburent gas and/or a fuel and being in communication, through an exterior radial wall (15) of the corresponding annular cylinder (5), with a combustion gas exhaust system (16, 31, 32), the two pistons (2, 3), the housing (4), the two cylinders (5) and the shaft (8) being fitted coaxially about the longitudinal axis (AA) of the shaft (8) and the reciprocating axial movements of the pistons (2, 3) being converted into rotation of the shaft (8) about its axis (A) by a movement conversion mechanism coupling the pistons (2, 3) to a central part (19) of the shaft (8), and comprising pawls (22), one end of each of which is compelled to follow endless undulations, circumferential (20) about the axis (AA) and of the same axial amplitude, which are exhibited by a rigid member, wherein the two pistons (2, 3) are mutually integral by their bases and form a monolithic piston block (1), a central element (1*a*) of which slides in the housing (4) so that the two pistons (2, 3) move simultaneously in the axial direction and alternately in each sense, and in that the pawls (22) of the movement conversion mechanism are radial pawls, retained in one of the two rigid members formed by the central part (19) of the shaft (8) and by the central element (1*a*) of the piston block (1), whereas the undulations (20) are defined by at least one groove made in an axial surface of the other rigid member, and in which or in each of which, one end of each radial pawl (22) is engaged, the piston block (1) comprises, at each of its axial ends, an axial double skirt (2*a*, 3*a*) comprising two annular crowns (9, 10) coaxial about the axis (AA) of the shaft (8) and mutually spaced radially, and one of which (9), in the outer radial position, forms said head of the corresponding annular piston (2, 3), sliding in the corresponding annular cylinder (5) and comprising outer and inner radial segments (34), sliding against the outer (15) and inner (13) walls respectively of said annular cylinder (15), whereas the annular crown in the inner radial

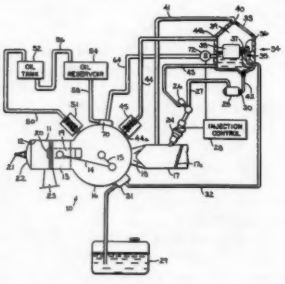
position (10) on the double skirt guides the piston block (1) in its axial movements by sliding within the inner wall (13) of said annular cylinder, the inner annular crown (10) of each double skirt of the piston (1) is hollow and comprises a flat and radial ring (10) which is spaced axially from the central element (1*a*) of the piston block (1) to which it is attached by at least one substantially axial and rigid column (10*a*) and which slides axially fluid tightly in an annular ante-chamber (30) delimited between the inner wall (13) of the corresponding annular cylinder (5) and a coaxial sleeve (35), surrounding the shaft (8) and fixed relative to said cylinder (5), the flat ring (10) of each inner crown is provided with axial apertures (11*a*) distributed regularly over its surface and associated with valves (11), so that the inner crown, with the antechamber (30), forms an admission pump for comburent gas and/or fuel into the corresponding combustion chamber (12), and in which the valves (11) are intended, on the one hand, to open the passage through the apertures (11*a*) into the interior of this inner crown, when the latter moves with the head (9) of the corresponding piston (2, 3) towards the base (5*a*) of the corresponding cylinder (5), to admit into this hollow inner crown (10) comburent gas and/or fuel available in the antechamber (30), and, on the other hand, to close the apertures (11*a*) when this inner crown (10) moves with the corresponding piston head (9) towards the other cylinder (5), in order to deliver comburent gas and/or fuel into said combustion chamber (12) through orifices (14) provided in the inner wall (13) of the corresponding cylinder (5).

4,887,559

SOLENOID CONTROLLED OIL INJECTION SYSTEM FOR TWO CYCLE ENGINE

Robert J. Hensel, and William G. Fenrich, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Apr. 1, 1988, Ser. No. 176,698
Int. Cl.[4] F01M *3/02*; F02B *33/04*
U.S. Cl. 123—73 AD **6 Claims**



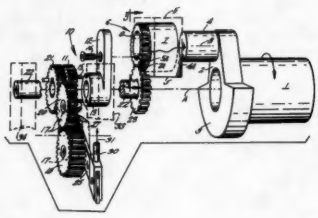
1. An oil injection system for a two cycle crankcase compression internal combustion engine having a fuel system supplying fuel to said engine, an oil source, an oil pump drawing oil from said oil source through an oil input line and delivering pumped oil through an oil input line to said fuel supply system, a solenoid valve in said oil output line controlling the flow of pumped oil to said fuel supply system, wherein said oil pump is a crankcase pressure driven oil pump.

4,887,560

CRANKSHAFT ASSEMBLY FOR VARIABLE STROKE ENGINE FOR VARIABLE COMPRESSION

William B. Heniges, 3325 SE. 120th Ave., Portland, Oreg. 97266

Filed Jun. 20, 1988, Ser. No. 208,452
Int. Cl.[4] F02B *75/04*
U.S. Cl. 123—78 F **10 Claims**



1. A crankshaft assembly for a variable compression engine with reciprocating pistons and including,

a crankshaft assembly including a web, a crankpin, a crankshaft arm,

piston driven means carried by said crankpin,

eccentric means including an eccentric bushing rotatably carried by said crankpin and interposed between the crankpin and said piston driven means, said eccentric means including an eccentric mounted gear whereby adjusted rotation of the eccentric means relative the crankpin will alter the spacial relationship of the eccentric and the piston driven means to the crankshaft axis to alter piston stroke, and

eccentric positioning means including a gear train comprising a first gear driven by said crankshaft arm for rotation about the crankshaft axis, a gear set driven by said first gear with certain gears of said set being displaceable, carrier means supporting said certain gears, control means coupled to said carrier means for positioning same and said certain gears, driven gears powered by said gear set with one of said driven gears in mesh with said eccentric mounted gear to impart arcuate rotation to same to alter the relationship of the eccentric bushing to said piston driven means to thereby determine piston stroke.

4,887,561

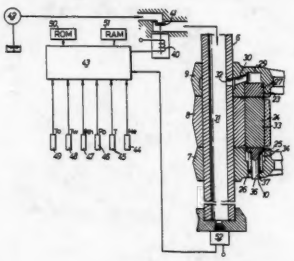
METHOD OF CONTROLLING VALVE OPERATION IN AN INTERNAL COMBUSTION ENGINE

Noriyuki Kishi, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1989, Ser. No. 337,492
Claims priority, application Japan, Apr. 13, 1988, 63-91169
Int. Cl.[4] F01L *1/34*
U.S. Cl. 123—90.16 **3 Claims**

1. A method of controlling operation of engine valves in an internal combustion engine, dependent on the rotational speed of the engine, by controlling a valve operation changing mechanism capable of opening and closing the engine valves selectively in a low-speed mode of operation corresponding to low-speed operation of the engine and a high-speed mode of operation corresponding to high-speed operation of the engine, said method comprising the steps of: determining a rotational speed of the engine at which an output torque produced by the engine when the valve operation changing mechanism is in the low-speed mode of operation and an output torque produced by the engine when the valve operation changing mechanism is

in the high-speed mode of operation are of a certain relationship to each other; and selecting a switching rotational speed



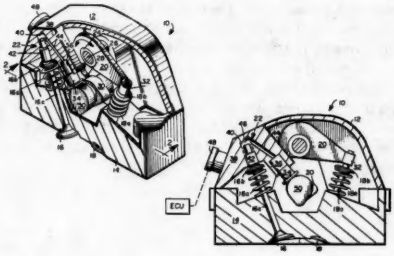
for switching operation of the valve operation changing mechanism based on said determined engine rotational speed.

4,887,562

MODULAR, SELF-CONTAINED HYDRAULIC VALVE TIMING SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Russell J. Wakeman, Newport News, Va., assignor to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Sep. 28, 1988, Ser. No. 250,180
Int. Cl.[4] F01L 9/02
U.S. Cl. 123—90.12 11 Claims



1. A modular self-contained hydraulic variable valve timing system for use with an internal combustion engine of the type having an engine block which includes a rotatable cam shaft, and sets of intake and exhaust valves respectively operatively associated with combustion cylinders of said engine, said modular self-contained variable valve timing system comprising:

a valve cover adapted to being coupled to said engine block in covering relationship to said intake and exhaust valves;

said valve cover having an integral case;

said case including a first open-ended bore in opposing relationship to a cam of said cam shaft, and a second open-ended bore in opposing relationship to a valve stem of one of said intake and exhaust valves, and means which fluid-connect said first and second bores so as to establish a hydraulic transfer path therebetween;

cam follower piston means received within, and closing, said first bore for following a profile of said cam and being reciprocally displaced within said first bore in response thereto;

valve actuating piston means received within, and closing, said second bore and being in opposing relationship to said stem associated with said one valve;

a control passageway in fluid communication with said hydraulic transfer path; and

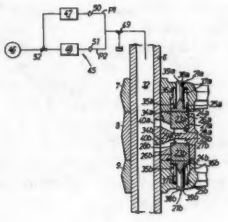
solenoid valve means fluid-connected to said control passageway and having first and second operative states for variably controlling timing and duration of said one valve opening wherein (i) said first state of said solenoid valve means allows said cam follower piston means, during a predetermined first portion of said cam profile being followed thereby, to be collapsibly displaced within said first bore without said collapsible displacement being hydraulically transferred, via said hydraulic transfer path, to said valve actuating piston means, and (ii) said second state of said solenoid valve means establishes a solid hydraulic link, during a predetermined second portion of said cam profile, between said cam follower piston means and said valve actuating piston means such that continued collapsible displacement of said cam follower piston means during said second portion of said cam profile being followed thereby is hydraulically transferred, via said hydraulic transfer path, to cause valve actuating piston means to be responsively displaced within said second bore and into operative engagement with said stem of said one valve thereby opening the same, whereby the timing and duration of said one valve opening is achieved.

4,887,563

VALVE OPERATING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Atsushi Ishida, and Tsuneo Konno, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1987, Ser. No. 108,019
Claims priority, application Japan, Oct. 16, 1986, 61-246426; Oct. 17, 1986, 61-247137
Int. Cl.[4] F01L 1/26
U.S. Cl. 123—90.16 21 Claims



1. Valve operating apparatus for operating valve means in an internal combustion engine, comprising:

a camshaft rotatable in synchronism with the operation of said engine;

at least three adjacent rocker arms for operating said valve means;

a plurality of cams on said camshaft, each said cam having a cam surface engaging one of said rocker arms and a cam profile to impart a desired mode of operation to said valve means;

a selective coupling device for selectively connecting and disconnecting adjacent rocker arms, said coupling device including pistons carried in guide holes by respective of said rocker arms and extendable by hydraulic pressure into connection with the adjacent rocker arm, means for supplying hydraulic pressure to said pistons, and spring means for biasing said pistons against the force of said hydraulic pressure; and

means for controlling the positional condition of said pistons with respect to said rocker arms, including:

a hydraulic circuit containing means for selectively supplying low pressure operating fluid or high pressure operating fluid to said coupling device; and

said spring means being operative to provide one biasing

spring force against said pistons upon the supply of low pressure operating fluid to said coupling device and a different biasing spring force against said pistons upon the supply of high pressure operating fluid thereto.

4,887,564

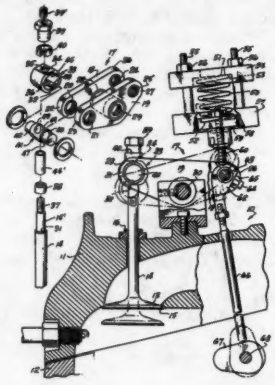
VALVE ACTUATION SYSTEM FOR DESMODROMIC INTERNAL COMBUSTION ENGINES

James R. Edwards, 4871 W. Howard, Ontario, Calif. 91761

Filed Apr. 10, 1989, Ser. No. 335,442

Int. Cl.[4] F01L *1/30*

U.S. Cl. 123—90.25 12 Claims



1. An improved internal combustion engine of the desmodromic type having an engine block with cylinders, a head held to the block and a plurality of intake valves and exhaust valves, a pivoted rocker arm assembly having a valve end for each valve and a second end at the opposite end of the rocker arm assembly as the valve end, said rocker arm assembly being attachable to a valve stem at the valve end of the rocker arm assembly, a cam shaft with cam lobes connected to said rocker arm assembly to pivot the rocker arm assembly about its pivot point in a first direction and means to return the rocker arm assembly to its original position, wherein the improvement comprises:

a valve to rocker arm assembly connection including a lower stop on each valve stem;

a shell member having a generally horizontal, hollow inner chamber open at each end, a lower exterior contact surface abutting said lower stop on each valve stem, said shell member having two generally vertically aligned openings through which the valve stem passes, and said shell member having an upper exterior contact surface and an upper and a lower bearing surface on the inner surface thereof;

a generally horizontal pin member held within said shell member having a bearing at each end held near the valve end of a rocker arm assembly and having a generally vertical opening which is larger than the valve stem and surrounding said valve stem, and said pin member having an upper bearing surface adjacent the upper bearing surface of said shell member and a lower bearing surface adjacent the lower bearing surface of said shell member; and

means for tightening said valve stem on to the upper exterior contact surface of the shell member to securely hold the shell member onto the valve stem whereby the valve stem can move vertically while the point of connection of the valve stem on the rocker arm assembly moves in an arcuate manner by the sliding of the shell member over the pin member.

4,887,565

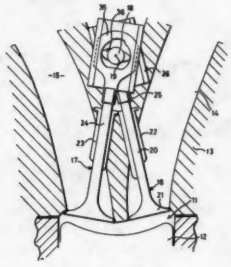
INTERNAL COMBUSTION ENGINE

Peter W. Bothwell, "Meoncote" 114 Shipston Road, Stratford upon Avon, Warwickshire, United Kingdom

Filed Oct. 27, 1988, Ser. No. 263,276

Int. Cl.[4] F01L *1/30*

U.S. Cl. 123—90.26 6 Claims



1. An internal combustion engine having at least one valve which is guided for reciprocation along a rectilinear path and operating means for moving the valve in opposite directions along the path, wherein the operating means comprises a follower, guide means for guiding the follower for reciprocation along a rectilinear path which is an extension of the path along which the valve reciprocates, coupling means for coupling the follower with the valve, a non-circular, endless track formed in the follower and facing towards an axis (called herein the cam axis), which is transverse to the path of the follower and a cam supported for rotation around the cam axis and having a pair of opposite contact portions which run on the track and cause reciprocation of the follower relative to the cam axis when the cam rotates around the cam axis, the guide means restraining rotation of the follower around the cam axis wherein, when the follower is at one end of its path, said contact portions of the cam are spaced apart in a direction transverse to the length of said rectilinear path.

4,887,566

HYDRAULIC VALVE LASH ADJUSTER

Toshimitsu Shida, Fujisawa, Japan, assignor to Fuji Valve Co., Ltd., Tokyo, Japan

Filed Apr. 3, 1989, Ser. No. 332,360

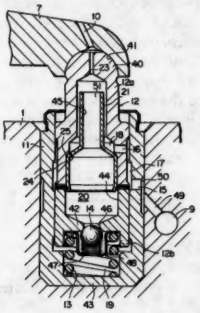
Claims priority, application Japan, Sep. 30, 1988, 63-128400[U]

Int. Cl.[4] F01L *1/24*

U.S. Cl. 123—90.51 4 Claims

1. A hydraulic valve lash adjuster which includes a cylindrical body; a hollow plunger slidably received within the body and having a reservoir formed therein; a generally cylindrical partition member placed within the plunger to increase the reservoir capacity; and check valve means for permitting oil to flow only from the reservoir into a high-pressure chamber defined between the bottom wall of the body and the bottom wall of the plunger; characterized in that the plunger comprises an upper plunger portion and a lower plunger portion, at least a portion of the partition member extends over the joint between the upper and lower plunger portions, and the upper

plunger portion being welded to the lower plunger portion by projection welding so that the partition member is deformed



inward by bulging of the welded portion to fix the partition member within the plunger.

4,887,567

CONNECTING ARRANGEMENT IN VALVE OPERATING SYSTEM FOR INTERNAL COMBUSTION ENGINE

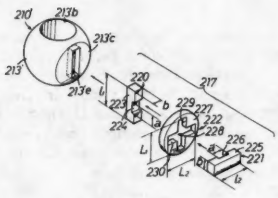
Masaaki Matsuura; Masaharu Nakamori; Masahiro Kuroki, and Mitsuru Ishikawa, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 945,661, Feb. 6, 1987, abandoned. This application Aug. 18, 1988, Ser. No. 235,821

Claims priority, application Japan, Apr. 10, 1985, 60-74516; Sep. 30, 1985, 60-216384; Sep. 30, 1985, 60-216386

Int. Cl.[4] F01L *7/10*

U.S. Cl. 123—190 D **4 Claims**



1. Coupling apparatus for connecting substantially axially aligned members for rotational movement, comprising:

a joint element attached to each of said members in mutual facing, interlocking relationship;

said joint elements being substantially perpendicularly disposed with respect to each other and each comprising a substantially rectangularly shaped body containing a substantially rectangularly shaped recess, the recess in each said body being greater in dimension than the joint element body received therein whereby limited relative movement in substantially perpendicular directions is permitted between said joint elements; and

an engaging member having an engagement hole for reception of said interconnected joint elements, said engagement hole being substantially cruciform in shape and sized to permit said limited relative movement with respect to each said joint element while preventing any substantial angular displacement therebetween, including clearance spaces to permit said limited relative substantially perpendicular movement between said joint elements.

4,887,568

CERAMIC INSERT FOR DEFINING PRECOMBUSTION CHAMBER IN CYLINDER HEAD

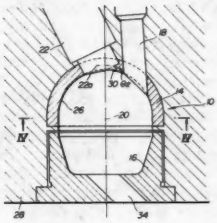
Tooru Matsuura, and Masato Taniguchi, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Aug. 31, 1988, Ser. No. 238,467

Claims priority, application Japan, Sep. 8, 1987, 62-136287[U]

Int. Cl.[4] F02B *19/16*

U.S. Cl. 123—270 **3 Claims**



1. A cylinder head comprising:

a cast cylinder head body having a fuel injection nozzle hole and a glow plug hole;

an insert assembly defining a precombustion chamber in said cylinder head body;

said insert assembly including a domed insert made of ceramics and cast into said cylinder body;

said fuel injection nozzle hole and said glow plug hole being so formed as to open through said domed insert into said precombustion chamber and be inclined with respect to a center axis of said precombustion chamber; and

means for providing an inner surface of said domed insert with part of a round shape, the axis of which coincides with the center axis of said precombustion chamber;

wherein said round shape is a truncated cone for thereby providing an inner surface of said domed insert with a recess constituting part of a truncated cone.

4,887,569

ELECTROSTRICTIVE ACTUATOR DEVICE AND FUEL INJECTION DEVICE USING SAME

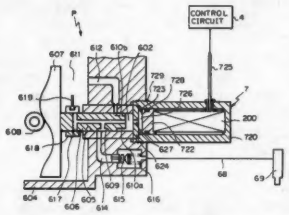
Toshihiko Igashira, Toyokawa; Yasuyuki Sakakibara, Nishio; Seiko Abe, Okazaki; Kiyonori Sekiguchi, Nukata; Akihiro Izawa, Nishio, and Hisasi Kawai, Toyohashi, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Division of Ser. No. 754,750, Jul. 15, 1985, Pat. No. 4,748,954. This application Apr. 28, 1988, Ser. No. 187,638

Claims priority, application Japan, Jul. 16, 1984, 59-147788; Dec. 12, 1984, 59-260639; Mar. 27, 1985, 60-62270; Apr. 15, 1985, 60-79718; May 30, 1985, 60-115281

Int. Cl.[4] F02M *9/00*

U.S. Cl. 123—300 **4 Claims**



1. A fuel injection control system for an injection pump for

a diesel engine having a pump chamber in which fuel pressure is repetitively increased and decreased by a plunger reciprocally movable within said pump chamber in timed relation with rotation of said diesel engine, said system comprising:

electrostrictive actuator means, located in a chamber communicated with said pump chamber to receive the fuel pressure which is changed by said reciprocally movable plunger as a physical force, said electrostrictive actuator means for expanding and constricting in accordance with an electrical charging and electrical discharging thereof during a fuel pressure increase phase;

fuel injection nozzle means coupled to said electrostrictive actuator means, for opening a nozzle valve to inject fuel to said diesel engine whenever a fuel pressure in said pump chamber becomes greater than a predetermined valve opening pressure;

electrical charging means for electrically charging said electristrictive actuator means with an electric high voltage at a first timing before said pump chamber attains said valve opening pressure during said pressure increase phase, to expand said electrostrictive actutor means and to increase the fuel pressure to an amount greater than said valve opening pressure in said pump chamber to begin a pilot fuel injection; and

electrical discharging means for electrically discharging said electrostrictive actuator means at a second timing after said first timing and during the increase of the fuel pressure in said pump chamber by said plunger so that said electrostrictive actuator means is constricted to rapidly decrease the fuel pressure in said pump chamber to complete said pilot fuel injection, and

wherein a main fuel injection is subsequently performed when said valve opening pressure is again reached by said plunger continuing to increase fuel pressure in said pump chamber.

4,887,570

SYSTEM FOR REGULATING THE IDLING SPEED OF ROTATION OF AN INTERNAL COMBUSTION ENGINE

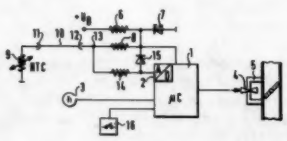
Joachim Meicher, Hofheim, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 2, 1988, Ser. No. 163,051

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1987, 3708999

Int. Cl.[4] F02M *3/07*

U.S. Cl. 123—339 **12 Claims**



1. A system for regulating the idling speed of rotation of an internal combustion engine, comprising

regulator means for applying a correction variable to a control element of the engine, said regulator means including means for comparing a signal representing an actual rotational speed with desired rotational speed; the correction variable, determined by comparison of the actual rotational speed signal with a desired rotational speed value, being applied to the control element; and wherein

an idling signal is inputted to said regulator means dependent upon whether the gas pedal is in the idling position;

said comparison means is disabled by an absence of the idling signal;

a predetermined correction variable is fed by the regulator means to the control element during absence of the idling signal and during a condition wherein the desired speed of rotation is smaller than the actual speed of rotation for more than a predetermined period of time;

said regulating means applies the predetermined correction variable to the control element only if, after the predetermined period of time, the actual speed-of-rotation is greater than the predetermined desired speed of rotation upon a start of the internal combustion engine;

a further signal is evaluated, which signal indicates the engine temperature, a predetermined temperature being assumed if the temperature signal lies outside of a predetermined range.

4,887,571

SPEED GOVERNOR FOR FUEL INJECTION PUMPS

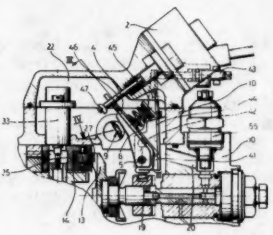
Helga Eheim, deceased, late of Stuttgart, and by Franz Eheim, executor, Max-Brod-Weg 8, 7000 40, Stuttgart, both of Fed. Rep. of Germany

Filed Aug. 15, 1985, Ser. No. 765,984

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1984, 3433423

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—367 **17 Claims**



1. A speed governor for fuel injection pumps of internal combustion engines, comprising a quantity control member (7), a governor lever (4) operative for controlling said quantity control member, an electric control motor, driven by an electrical signal from an electronic control unit that processes engine parameters without any quantity control member positional feedback relative to said electronic control unit, said electric control motor adapted to actuate said quantity control member of said injection pump, a travel limiting means (9) for said quantity control member which includes a stop position for determining the maximum injection quantity, said travel limiting means for said quantity control member including a piston means (49) that is displacable by hydraulic means counter to a spring force (54) in which a position of said piston means is variable independent of said electric control motor which is operative by said electronic control unit between a position for starting quantity and one for full-load quantity in accordance with engine characteristics.

4,887,572

SIGNAL GENERATING ROTOR OF A DISTRIBUTOR FOR AN INTERNAL COMBUSTION ENGINE AND A METHOD OF PRODUCING THE SAME

Seiki Kodama, and Shigemi Murata, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 18, 1988, Ser. No. 259,375

Claims priority, application Japan, Nov. 9, 1987, 52-170982

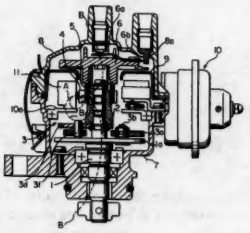
Int. Cl.[4] F22D *1/00;* **G01B** *7/30;* **F02P** *5/04*

U.S. Cl. 123—414 **10 Claims**

1. An ignition timing signal generating rotor adapted to be

operatively coupled to a shaft of a distributor for an internal combustion engine which rotates in synchronism with an engine crankshaft, said signal generating rotor comprising:

an annular reluctance varying rotor portion made of a sintered powder of a magnetic material, said reluctance varying rotor portion having the form of a short hollow cylinder which has a plurality of projections radially outwardly extending from an outer circumferential surface thereof, so that a reluctance of a magnetic circuit



formed in said reluctance varying rotor portion is varied in synchronism with the rotation of said rotor portion; and

a tube made of a sintered powder of a non-magnetic material adapted to be coupled to a spark advancing sleeve operatively connected to the shaft of said distributor, said tube being secured to an interior circumferential surface of said reluctance varying rotor portion,

wherein said tube and said reluctance varying rotor portion are made of materials sintered simultaneously in a single piece.

4,887,573

IGNITION TIMING ADJUSTING APPARATUS FOR INTERNAL COMBUSTION ENGINE

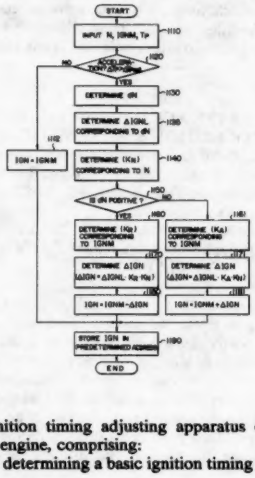
Yasuhiko Fujiwara, Kanagawa; Toshiro Abe, Mitaka; Atsunori Hashimoto, Fujisawa; Shinsuke Nakazawa, Yokohama; Masami Nagano, and Takeshi Atago, both of Katsuta, all of Japan, assignors to Hitachi, Ltd, Tokyo and Nissan Motor Co., Ltd., Yokohama, both of, Japan

Filed Nov. 7, 1988, Ser. No. 268,198

Claims priority, application Japan, Nov. 9, 1987, 62-280922

Int. Cl.[4] F02P *5/15, 5/14, 5/04*

U.S. Cl. 123—422 **4 Claims**



1. An ignition timing adjusting apparatus of an internal combustion engine, comprising:

means for determining a basic ignition timing on the basis of values indicating an operational state of an internal combustion engine;

means for detecting acceleration of said engine;

means for detecting revolution speed change of said internal combustion engine;

first ignition timing compensating means for determining a first ignition timing compensation magnitude for compensating said basic ignition timing on the basis of the output of said engine revolution speed change detecting means;

second ignition timing compensating means for determining a second ignition timing compensation magnitude for compensating said basic ignition timing on the basis of the load condition of said internal combustion engine; and

means for determining the ignition timing on the basis of said basic ignition timing, said first ignition timing compensation magnitude and said second ignition timing compensation magnitude when the acceleration of the engine is detected by said acceleration detecting means.

4,887,574

CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES

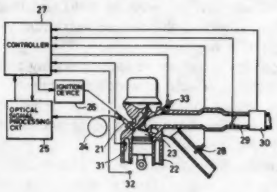
Hiroshi Kuroiwa, Hitachi; Yoshishige Oyama, Katsuta, and Toshiharu Nogi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 184,076

Claims priority, application Japan, Apr. 21, 1987, 62-96123; Jun. 3, 1987, 62-138071

Int. Cl.[4] F02P *5/10;* **G01M** *15/00;* **G01L** *23/22*

U.S. Cl. 123—425 **13 Claims**



6. A combustion control apparatus for an internal combustion engine having a plurality of cylinders and means for generating a timing signal relating to the timing of firing of combustion in said cylinders, comprising:

a plurality of combustion flame optical sensors, each associated with a respective cylinder, for detecting firing of combustion in said cylinders;

a plurality of optical fiber cables, each connected to a respective one of said combustion flame optical sensors;

an optical signal processing circuit connected to all of said optical fiber cables to produce an output signal having a series of pulses each corresponding to an optical signal of a respective optical sensor;

detecting means responsive to said timing signal and said output signal of said optical signal processing unit for detecting a condition of combustion in said cylinders on the basis of said series of pulses; and

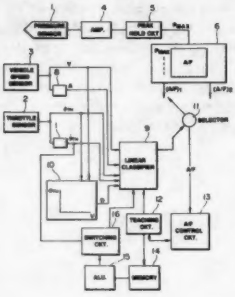
means for controlling at least one of fuel air ratio and ignition timing in said internal combustion engine using detected conditions of combustion in said cylinders.

4,887,575

SYSTEM AND METHOD FOR CONTROLLING A MIXTURE RATIO OF AIR-FUEL MIXTURE SUPPLIED TO AN INTERNAL COMBUSTION ENGINE

Hiroshi Takahashi, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Sep. 22, 1988, Ser. No. 247,292
Claims priority, application Japan, Sep. 22, 1987, 62-236298
Int. Cl.[4] F02D 41/14
U.S. Cl. 123—435 18 Claims



1. A system for determining and controlling the mixture ratio of an air-fuel mixture supplied to an internal combustion engine, comprising:

(a) first means for detecting an internal pressure of an engine cylinder;

(b) second means for deriving a maximum value of the internal cylinder pressure detected by the first means for each combustion stroke of the engine cylinder and for estimating the rich-side air-fuel mixture ratio and lean-side air-fuel mixture ratio from the derived maximum value of the internal cylinder pressure;

(c) third means for detecting various operating conditions of the engine and a vehicle in which the engine is mounted affecting a change in the air-fuel mixture ratio except the first means and outputting first signals indicative of the individual operating conditions;

(d) fourth means for processing a weighting calculation for the first signals using a weight vector and outputting a second signal indicative of the result of the weighting calculation, the second signal being used to determine the rich or lean air-fuel mixture ratio;

(e) fifth means for comparing the level of the second signal with a reference signal level so as to determine whether the air-fuel mixture ratio deviates from the rich-side or lean-side with respect to a target air-fuel mixture ratio;

(f) sixth means for ascertaining the air-fuel mixture ratio from the rich-side or lean-side air fuel mixture ratio estimated by the second means on the basis of the determination result by the fifth means;

(g) seventh means for controlling the mixture ratio of air-fuel fuel mixture supplied to the engine on the basis of the air-fuel mixture ratio ascertained by the sixth means;

(h) eighth means for determining the correctness or incorrectness of the determination result by the fifth means according to the air-fuel mixture controlled by the seventh means; and

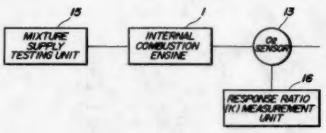
(i) ninth means for correcting the weight vector in the fourth means on the basis of the result of determination by the seventh means in a direction toward which a percentage of the correct determination is increased.

4,887,576

METHOD OF DETERMINING ACCEPTABILITY OF AN EXHAUST CONCENTRATION SENSOR

Norio Inamoto, and Takahiro Minowa, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 921,538, Oct. 21, 1986, abandoned. This application Sep. 28, 1988, Ser. No. 252,025
Claims priority, application Japan, Oct. 21, 1985, 60-234772
Int. Cl.[4] F02D 41/26
U.S. Cl. 123—479 2 Claims



1. A method of determining the acceptability of an exhaust concentration sensor arranged in an exhaust system of an internal combustion engine for sensing the concentration of a component contained in exhaust emitted by the engine, the method comprising the steps of:

(1) continuously supplying an air-fuel mixture to the engine at a predetermined constant air-fuel ratio corresponding to a stoichiometric mixture ratio;

(2) comparing a sensed value outputted by the exhaust concentration sensor indicative of the concentration of said component, with a predetermined reference value;

(3) obtaining a ratio of a first time period during which the sensed value is higher than said predetermined reference value to a second time period during which said sensed value is lower than said predetermined reference value; and

(4) determining that the exhaust concentration sensor is acceptable when the obtained ratio between the first time period and the second time period is within a predetermined range, and determining that the exhaust concentration sensor is not acceptable when the obtained ratio between the first time period and the second time period is not within the predetermined range,

wherein said exhaust concentration sensor is arranged upstream of a three-way catalyst disposed in said exhaust system, and wherein said predetermined range of said ratio is defined by two extreme limit values, one of which is set to a maximum allowable value of the amount of carbon monoxide and hydrocarbon contained in the exhaust and the other to a maximum allowable value of the amount of nitrogen oxides contained in the exhaust.

4,887,577

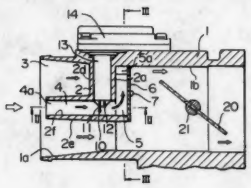
HOT-WIRE TYPE AIR FLOW METER AND AN INTERNAL COMBUSTION ENGINE WITH THE SAME

Nobukatsu Arai, Ushiku; Yoshihito Sekine, Ibaraki; Tadao Osawa, Katsuta; Hiroatsu Tokuda, Katsuta; Toshifumi Usui, Katsuta, and Mitsukuni Tsutsui, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,525
Claims priority, application Japan, Jun. 17, 1987, 62-148993
Int. Cl.[4] F02D 5/00
U.S. Cl. 123—494 11 Claims

1. A hot-wire type air flow meter comprising a primary flow path constituting an intake air passage of an internal combustion engine, a hot-wire element for measuring intake air, and an auxiliary flow path provided substantially entirely within said primary flow path and having mounted therein said hot-wire element, said auxiliary flow path having an L-shaped configuration including a flow path portion formed in an axial direction of said primary flow path and a flow path portion formed in a radially inward direction of said primary flow path and

extending at least half way across said primary flow path, and wherein said auxiliary flow path portion in the axial direction



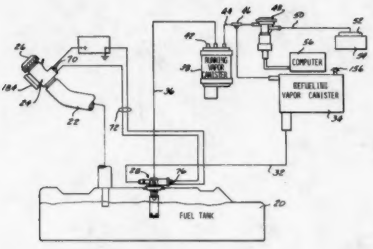
of said primary flow path is provided eccentrically with respect to said primary flow path.

4,887,578

ON BOARD REFUELING VAPOR RECOVERY SYSTEM

William F. Woodcock, Dearborn; William E. Ruhig, Jr., Sterling Heights, both of Mich., and Loren H. Kline, Oregon, Ohio, assignors to Colt Industries, Inc., New York, N.Y.

Filed Sep. 25, 1987, Ser. No. 101,069
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—519 **27 Claims**



1. An improvement in a vehicle having an internal combustion engine, a fuel supply system including a refillable fuel storage tank for supplying volatile fuel to said engine, the fuel tank including a filler pipe having an inlet end adapted to sealingly receive an elongate tubular fuel dispensing nozzle of a standard diameter to accommodate refueling of said vehicle from an external source of volatile fuel and a running vapor recovery system including a canister for storage of fuel vapors generated during operation of the engine;

said improvement comprising an onboard additional refueling vapor recovery system mounted in said vehicle for storing and disposing of the relatively larger quantity of fuel vapor displaced from the fuel tank by the refilling of the tank with volatile fuel, said refueling vapor recovery system being connected in parallel with the running vapor recovery system and comprising a refueling vapor storage canister mounted in said vehicle, first conduit means for conducting fuel vapor displaced from said tank during the refueling of the tank with volatile fuel from the tank into said refueling vapor storage canister, first valve means operable in a normally closed position to prevent the flow of vapor from the tank to said refueling vapor canister via the first conduit means and operable in an actuated open position to permit the flow of fuel vapor from the tank through said first conduit means into said refueling vapor canister, actuating means responsive to the insertion of the nozzle through sealing means for actuating said first valve means to its open position, and onboard computer controlled means responsive to the operation of the engine for conducting fuel vapor at a controlled rate from said refueling vapor canister to the engine for combustion in the engine.

4,887,579

LP-GAS CARBURETION SYSTEM APPARATUS AND METHOD

Ronald L. Fenton, Wood Dale, Ill., and Robert Brandt, New York, N.Y.

Filed Jul. 12, 1989, Ser. No. 378,828
Int. Cl.[4] F02M *21/02*
U.S. Cl. 123—525 **14 Claims**

1. In a LPG fuel system for an internal combustion engine an improved fuel delivery apparatus comprising:

a tank member having thermally conductive walls and a thermally conductive filler insert in thermally conductive contact with said walls;

conduit means connected to said tank member for drawing vapor therefrom; and

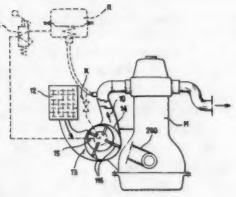
a pressure regulator connected to said conduit means for receiving vapor from said tank member and delivering vapor under a controlled pressure therefrom to the engine.

4,887,580

SUPERCHARGER DEVICE FOR RECIPROCATING INTERNAL COMBUSTION ENGINES, PARTICULARLY FOR MOTOR VEHICLES

Alfredo Hilfiker, Avigliana, Italy, assignor to Pneumofore S.P.A., Turin, Italy

Filed Mar. 22, 1988, Ser. No. 173,525
Claims priority, application Italy, Mar. 30, 1987, 67243 A/87; Sep. 11, 1987, 67773 A/87
Int. Cl.[4] F02B *33/36*; F04C *29/10*
U.S. Cl. 123—564 **2 Claims**



1. Supercharger device for internal combustion reciprocating engines, particularly for motor vehicles, comprising a positive displacement rotary supercharger inserted on the induction manifold of an engine, wherein said supercharger is constantly driven by the engine shaft, the capacity and therefore the delivery pressure of said supercharger being variable by virtue of a controlled variation of the geometry of pumping means of said supercharger, said pumping means comprising a stator cylinder, a rotor and vanes, wherein the variation of the geometry of the pumping means is obtained by means of elements adapted to produce, upon the action of control means, the retention of the vanes in the respective seats of the rotor, whereby the rotor of the compressor is angularly timed with the engine shaft to synchronize the pulses of the supercharger with the induction phase of said engine to improve the filling

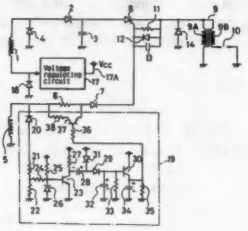
coefficient, wherein the rotor of the supercharger is provided with mechanical vane retention means, wherein the mechanical vane retention means are constituted by wedge-shaped radial blocks, slideable in corresponding wedge-receiving seats provided on the rotor and wherein each block is provided with a wedge-shaped surface intended to engage, as an effect of the centrifugal force, the lateral surface of the corresponding vane; positive control means being provided to gradually disengage said blocks from said lateral surfaces of the vane wherein said positive control means comprise, for each block, a shaft having a threaded end engaging in a correspondingly threaded hole of the block; the other end of the return shaft being provided with a pinion engaging with the complementarily toothed portion of a control shaft, coaxial to the rotor, the rotation whereof corresponds to a respective engagement or disengagement motion of the block with or from the vane.

4,887,581

IGNITION APPARATUS FOR INTERNAL COMBUSTION ENGINE

Hiroshi Okuda, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 16, 1988, Ser. No. 194,567
Claims priority, application Japan, May 15, 1987, 62-119232
Int. Cl.[4] F02P *3/08*
U.S. Cl. 123—602 **1 Claim**



1. An ignition apparatus for an internal combustion engine, comprising:

a magneto-generator for generating an electric power when rotated by an engine;

a first capacitor adapted to be charged by said electric power;

an ignition coil for generating an ignition voltage by discharge therethrough of the electric power charged into said first capacitor;

a signal generating winding for generating a signal in synchronism with revolution of he engine;

a semiconductor switching means inserted between said first capacitor and said ignition coil and operated by said signal of said signal generaating winding;

a second capacitor which is charged while said signal generating winding is not generating said signal, and adapted to be discharged by input of said signal of said signal generating widing;

a third capacitor which is charged while said signal generating winding is not generating said signal and is adapted to be further charged by the electric charge of said second capacitor, when said signal of said signal generating winding is inputted;

a switching device controlled by a terminal voltage of said third capacitor;

a fourth capacitor which is charged while said signal generating winding is not outputting the signal and is adapted to be discharged while said voltage of said third capacitor is higher than a predetermined voltage; and

a switching means for changing a triggering level of said semiconductor switching means by a terminal voltage of said fourth capacitor.

4,887,582

GEAR MECHANISM FOR COMPOUND BOW

Jesse R. Chattin, 7201 South 49th Street, Tampa, Fla. 33619

Filed Jan. 26, 1989, Ser. No. 301,724
Int. Cl.[4] F41B *5/00*
U.S. Cl. 124—23 R **34 Claims**

1. A control mechanism for a bow comprising:

a first pulley for attachment to one end of the drawstring of said bow, said first pulley having a circumferential portion around which said drawstring can be wound and a portion internal to said circumferential portion for controlling the orbit of said circumferential portion;

means for establishing at a first end of said bow a first orbit around which said first pulley orbit controlling portion may traverse and for also establishing a center point of said first orbit;

a second pulley for attachment to one end of a tension cable, the other end of said tension cable attachable to a second end of said bow, said second pulley having a circumferential portion around which said tension cable can be wound, said second pulley including:

means off-set from the center thereof for pivoting said second pulley around said established first orbit center point; and

means at the center thereof for attachment to said first pulley for driving said second pulley around said pivot means while said first pulley traverses said orbit establishing means.

4,887,583

BRAKING DEVICE FOR SAFETY TOY-GUN

Hsien-Chang Lin, 8F-2, 375 Hsin-Yi Rd., Sec.4, Taipei, Taiwan

Filed Dec. 7, 1987, Ser. No. 129,804
Int. Cl.[4] F41B *7/08*
U.S. Cl. 124—40 **3 Claims**

1. A safety device for a toy gun having a barrel and a trigger for firing a toy projectile, said safety device comprising

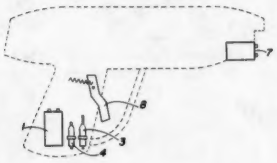
a power source;

a photo-electric switch mounted on an outer wall surface of

the barrel of the gun and connected to said power source by means of a starting switch, said photo-electric switch comprising a light emitter and a light sensor such that said photo-electric switch is closed when an object reflects light emitted by said emitter back to said sensor and said photo-electric switch is open when the emitted light is not reflected to said sensor;

a first electro-magnetic firing pin, said first firing pin being normally in a position so as to block movement of said trigger and prevent firing of said projectile;

said first firing pin being connected in series with said starting switch to said power source, such that when said



starting switch is closed, said first firing pin is energized and thereby moved into a position to allow movement of said trigger;

a second electro-magnetic firing pin, said second firing pin being normally in a position so as to allow movement of said trigger and allow firing of said projectile;

said second firing pin being connected in series with said photo-electric switch and said power supply, such that when said photo-electric switch is closed, said second firing pin is energized and thereby moved to a position so as to block movement of said trigger and prevent firing of said projectile.

4,887,584

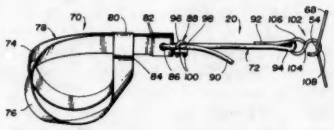
TRAINING DEVICE FOR ARCHERY

Richard F. Carella, 35572 Strathcona Dr., Mt. Clemens, Mich. 48043

Continuation-in-part of Ser. No. 891,863, Jul. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 848,983, Apr. 7, 1986, abandoned. This application Nov. 25, 1986, Ser. No. 934,674

Int. Cl.[4] F41B *5/00*; A63B *21/02*

U.S. Cl. 124—90 **24 Claims**



1. An archery training device for teaching an archer proper muscular control and body positioning, the training device comprising: a string arm connector located adjacent the elbow of the string arm, said string arm connector including a slip loop and defining a pair of loops connected to the slip loop for positioning above and below; one loop of the pair of loops being securable to the upper arm of the archer'string arm proximate the elbow for tightening under tension; the other loop of the loops being securable to the forearm of the archer'-string arm proximate the elbow for tightening under tension; said pair of loops cooperating together with said slip loop upon tightening under tension to prevent shifting of the string arm connector with respect to the upper ar and forearm proximate the elbow of the string arm; and a draw force carrying member extending forwardly from the string arm connector toward an anchor point such that the device aids in positioning the archer'bow hand, string arm, shoulders, and the anchor point along a plane of release where the muscles properly hold the bow force with positioning that maintains the bow hand and the anchor point against movement that would adversely affect accuracy upon string release during actual shooting.

4,887,585

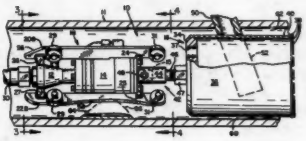
METHOD AND APPARATUS FOR CUTTING TAPS IN SEWER LINES

David H. Nutt, 1601 Somera Dr., Forest Grove, Oreg. 97116

Filed May 20, 1988, Ser. No. 196,985

Int. Cl.[4] B28D *1/04*; B24B *7/00*

U.S. Cl. 125—14 **11 Claims**



1. A tap cutter for clearing a pipe comprising:

a frame defining a front end and a back end;

a hydraulic motor having a shaft mounted within the frame adjacent the front end;

a hydraulic jet thruster connected within the frame adjacent the back end of the frame for propelling the tap cutter through the pipe;

a bit removably connected to the shaft; and

roller means connected to the frame for maintaining the frame spaced apart from the interior surface of the pipe; the roller means being mounted on and aligned with the frame so as to prevent the frame from rotating within the pipe.

4,887,586

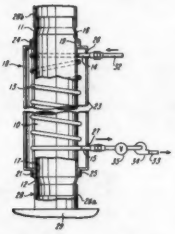
HEAT RECOVERY APPARATUS

Lonnie D. Walters, 6410 Highbury St., Dayton, Ohio 45424

Filed Dec. 21, 1981, Ser. No. 332,520

Int. Cl.[4] F24D *9/00*

U.S. Cl. 126—101 **12 Claims**



1. Heat recovery apparatus comprising a tubular element the interior surface of which defines an unobstructed flow passage, said element being structured at its opposite ends to facilitate its installation to form a part of ductwork through which products of combustion and/or other fluid embodying heat energy may escape from a furnace or the like, a helical coil of tubing wrapped around the exterior of said tubular element in heat transfer contact therewith, opposite ends of said tubing being projected to serve respectively as the inlet for fluid which is to be heated in passage therethrough and the outlet for the delivery of the so heated fluid therefrom, a protective shell surrounding and capping said coil of tubing and posi-

tioned in a circumferentially and substantially equidistantly end spaced relation thereto, said shell being apertured for projection therethrough of said opposite ends of said tubing to be connected with and form a part of a fluid handling and conditioning system, said tubular element being elongated relative to and extending beyond the respective ends of said protective shell, the respective ends of said shell being secured to and about said tubular element relatively adjacent its ends to form with said tubular element and that portion of the coil capped and contained thereby a unitary heat recovery device which may be inserted to form a part of new or existing ductwork through which products of combustion and/or other fluid embodying heat energy may flow and in the course of its flow move to and through said tubular element in heat transfer relation to such fluid as may be passing through said coil.

4,887,587

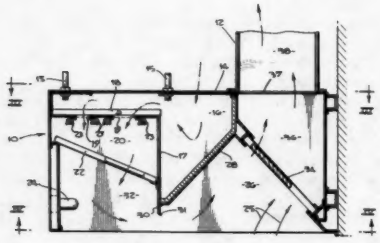
COMMERCIAL AIR VENTILATION SYSTEM

Michael Deutsch, 3420 E. Shea - Ste. 125, Phoenix, Ariz. 85028

Filed Jul. 1, 1988, Ser. No. 214,329

Int. Cl.[4] F24C *15/20*

U.S. Cl. 126—299 D **7 Claims**



1. A commercial air ventilation system, comprising:

an elongated ventilating hood;

defining plural means for providing make-up air to said system, said plural means for providing make-up air to said system includes a primary make-up air plenum and a secondary make-up air plenum, said primary and secondary make-up air plenums separated by a continuous linear double slot wall having perforated plates;

an intake opening;

an exhaust conduit opening;

means for exhausting air; and

a continuous air diffusing means separating said plural means for providing make-up from said means for exhausting air, said continuous air diffusing means sloped for diffusing air into said means for exhausting air.

4,887,588

GREASE ABSORPTION BOX FOR ROOF USE

Terry Rial, R.R. #1, Box 161, Clare, Iowa 50524

Filed Dec. 27, 1988, Ser. No. 291,220

Int. Cl.[4] F24C *15/20*

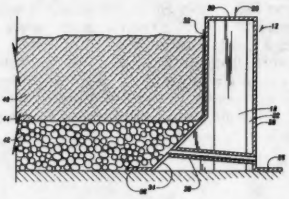
U.S. Cl. 126—299 R **11 Claims**

1. A grease absorption box for use with roof top cooking exhaust systems, comprising:

(a) a plurality of durable, lightweight, non-biodegradable blocks, each of said blocks having means to be releasably joined to another of said blocks so as to allow formation of a perimeter curb around a roof top cooking exhaust fan, and with at least some of said blocks having means to allow water to drain from within said perimeter curb to outside of said perimeter curb;

(b) a bottom bed of highly porous filler material within said perimeter curb;

(c) a layer of water permeable flexible sheet material covering said porous filler material; and



(d) on top of said sheet and substantial filling the rest of said perimeter curb a finely divided grease absorption material.

4,887,589

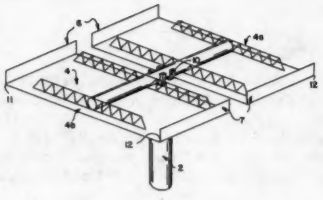
SOLAR ENERGY TRACKING STRUCTURE INCORPORATING WIND SPOILERS

Melvin W. Frohardt, Littleton; Keith H. Hartz, Aurora, both of Colo., and Patrick C. Hardee, deceased, late of Aurora, Colo. (by Judy D. Hardee, executrix), assignors to Martin Marietta Corporation, Bethesda, Md.

Filed Nov. 20, 1987, Ser. No. 123,621

Int. Cl.[4] F24J *2/46*

U.S. Cl. 126—418 **9 Claims**



1. A solar energy tracking assembly, said assembly producing reduced torque loading forces due to wind on the rotating portion of said tracking assembly, said solar energy tracking assembly comprised of:

a fixed position base having one and securely fixed to the ground and having the second end supporting the remaining tracking assembly components;

solar energy collecting means comprising a moving structure frame and at least one solar collecting element attached thereto

means for rotating said solar energy collecting means in relation to the sun in order that said solar energy collecting means maintain the proper attitude for collection of incident solar energy; and

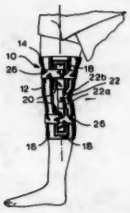
a wind spoiler assembly, said wind spoiler assembly attached to said solar energy collecting means in a manner for disrupting air flow passing over and under said solar energy collecting means for thereby reducing aerodynamic lift and the resulting torque load placed upon said solar energy collecting means by the wind, said wind spoiler assembly comprising at least one spoiler attached to said moving structure frame and having a lengthwise dimension at least that of the corresponding dimensions of said solar collecting element and of the portion of said moving structure frame to which said spoiler is attached.

4,887,590

JOINT SUPPORT FOR UNDERWATER USE OR FOR USE IN A WET ENVIRONMENT

Brian V. Logue, 7 Roosevelt St., Bayville, N.Y. 11709, and Theodore J. Rusnack, 22 Pound Hollow Ct., Old Brookville, N.Y. 11545

Continuation of Ser. No. 4,917, Jan. 20, 1987, abandoned. This application Jun. 22, 1988, Ser. No. 211,137
Int. Cl.[4] A61F 5/00
U.S. Cl. 128—80 C 28 Claims



1. A method for providing support to a knee or elbow joint while engaging in aquatic activities, comprising:

providing a buoyancy to said joint when immersed in water, said buoyancy being provided by providing a pliable enclosure having a continuous substantially tubular contour made from an elastomeric material which substantially prevents passage and absorption of water, including neoprene rubber for placement over the knee or elbow joint and surrounding said joint, the pliable enclosure further including,

(i) a joint supporting means associated with the pliable enclosure, being fixedly positionable with respect to the pliable enclosure to provide support against both lateral and torsional forces imposed on the joint during use, including when entering the water, in the water, and leaving the water, and

(ii) retaining means associated with the pliable enclosure and said joint supporting means to allow the fastening and unfastening of the pliable enclosure and associated joint supporting means to a limb, such as the leg or arm of the user, above and below the joint, and to facilitate the positioning of the pliable enclosure and associated joint supporting means about the joint to prevent longitudinal displacement of the pliable enclosure and associated joint supporting means on the limb when said retaining means is secured about the joint during use;

(b) placing the pliable enclosure and the associated joint supporting means on the limb of the user, about the joint which requires support;

(c) aligning the joint supporting means on either side of the joint to allow the flexing and unflexing of the joint in alignment with the flexing and unflexing of said pliable enclosure and said joint supporting means;

(d) fastening said retaining means on the limb above and below the joint to secure the pliable enclosure end associated joint supporting means about the joint to prevent longitudinal displacement of the pliable enclosure along the limb of the user during use; and,

(e) engaging in aquatic activities.

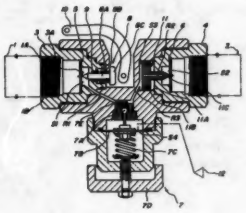
4,887,591

MIDGET LIFE-SAVING RESPIRATOR GAS TANK APPARATUS

Toshiaki Okumura, Osaka, Japan, assignor to Grace Create Inc., Osaka, Japan

Filed Jul. 27, 1988, Ser. No. 224,634
Int. Cl.[4] A62B 7/00
U.S. Cl. 128—205.21 8 Claims

1. A midget respirator gas tank apparatus comprising at least first and second gas tank holders for securing thereto at least a first and a second small respirator gas tank, each gas tank including a pin-penetrable end closure means for retaining the gas within the tank in a gas-tight state, a pressure regulator connected to said first and second gas tank holders, gas passages in said apparatus that extend from each of said first and second gas tank holders to said pressure regulator, a first pin mechanism supported in said apparatus in a gastight state relative to said first gas tank holder for perforating said end closure of said first gas tank positioned at a pin-penetrable



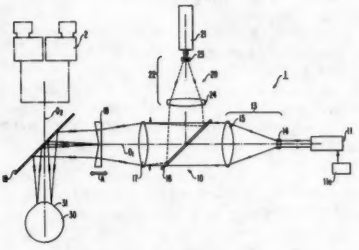
position in said first gas tank holder, and a piston drive pin mechanism positioned relative to said second gas tank holder and means operable to perforate the end closure of said second gas tank held in said second gas tank holder due to pressure of a respirable gas jetting out of said first gas tank when perforated by said first pin mechanism, wherein said pressure regulator is operable to regulate the pressure of the respirable gas from said first and second gas tanks, the pressure-regulated respirable gas being guided to a mouthpiece from a common chamber in said pressure regulator.

4,887,592

CORNEA LASER-CUTTING APPARATUS

Hanspeter Loertscher, 100 Ocean Lane Dr., #207, Key Biscayne, Fla. 33149

Filed Jun. 2, 1987, Ser. No. 56,711
Int. Cl.[4] A61N 5/06
U.S. Cl. 606—5 15 Claims



1. A cornea laser-cutting apparatus comprising:

means for generating laser beams;

means for projecting said laser beams onto a cornea to cut the cornea, said projecting means having an optical axis thereof;

means for converging and focusing the laser beams onto an imaging plane substantially coincident with the surface of the cornea;

axicon lens means, disposed between said converging means and said imaging plane along said optical axis, for converting the laser beams exiting from said converging means into annularly shaped laser beams impinging on the cornea; and

means for moving said axicon lens means along said optical

axis to change the diameter of the annularly shaped laser beams impinging on the cornea.

4,887,593

METHOD AND APPARATUS FOR ELECTROSURGICALLY RESECTIONING AN EQUINE SOFT PALATE TO ALLEVIATE OCCLUSION OF THE BREATHING PASSAGEWAY

Michael J. Wiley, 4721 Tanglewood Ct., Norman, Okla. 73072; Helen J. Albrecht, 14500 S. Pennsylvania, Oklahoma City, Okla. 73170, and Albie A. Dale, 300 36th Ave., S.W., Norman, Okla. 73072

Filed Jan. 26, 1989, Ser. No. 302,001
Int. Cl.[4] A61B *17/36*
U.S. Cl. 606—45 **14 Claims**

1. An equine electrosurgical instrument comprising:

an elongated, manually bendable shaft having a proximal end, and having a digital end portion, said shaft further including a bight portion of rounded, semicircular configuration at, and forming a major part of, the distal end portion of said shaft, said bight portion defining an open mouth;

a handle of electrically non-conductive material secured to the proximal end of said shaft and configured to facilitate axial reciprocation of said shaft and concurrent rotative movement of said bight portion and said handle about the longitudinal axis of said shaft;

elongated electrical conductor means secured to said shaft and extending from the proximal end thereof to said distal end portion, said electrical conductor means including a cutting section extending across said bight portion to block the mouth of the bight portion;

a sleeve of electrically non-conductive material encasing said shaft and a major portion of said conductor means except for said cutting section, and extending from the proximal end to the distal end portion of the shaft, including said bight portion;

switch means on said handle and electrically connected to said conductor means for cutting and for cauterizing flesh in contact with said cutting section; and

additional circuit components comprising a plug and electrical leads extending through said handle to said shaft and connecting said plug to said conductor means and to said switch means.

4,887,594

VIBRATORY MEDICATOR

Louis Siegel, 500 Grosvenor Rd., Rochester, N.Y. 14610

Filed Jun. 9, 1988, Ser. No. 204,398
Int. Cl.[4] A61H *1/00*
U.S. Cl. 128—36 **11 Claims**

1. A vibratory medicator comprising:

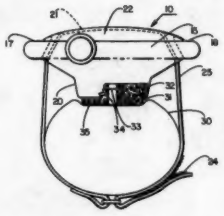
a. a body shaped and sized to be held within a hand so that a palm of said hand can press a working surface of said body against a skin region to be medicated, said body containing a motor-driven eccentric mass arranged for vibrating said body against said skin region;

b. each opposite side of said body having a strap loop grippable by a hand and arranged so that both loops span a strap line and allow a strap extending along said strap line to be threaded through said strap loops for strapping said body against said skin region to be medicated;

c. a vibratory medication dispenser mounted on said working surface of said body in between said strap loops and opposite a surface of said body engaged by a hand holding said body so that said medication dispenser vibrates with said body against said skin region;

d. said working surface being disposed on said body so that a hand holding said body can press said medication dispenser vibrationally against said skin region, and so that said strap threaded through said strap loops can hold said body against said skin region to press said medication dispenser vibrationally against said skin region;

e. vibration of said body with said medication dispenser



pressed against said skin region being arranged for delivering said medication from said dispenser to said skin region and enhancing the penetration of said medication into said skin region; and

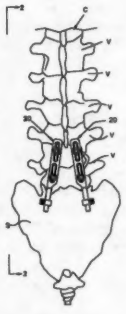
f. a battery and a motor for driving said eccentric mass are each pressed into position in said body by a single, electrically conductive spring that presses said battery against an electric terminal, and presses said motor against an abutment, while conducting electricity from said battery to said motor.

4,887,595

SURGICALLY IMPLANTABLE DEVICE FOR SPINAL COLUMNS

Charles F. Heinig, Charlotte, N.C.; Marc A. Asher, Prairie Village, Kans., and Walter E. Strippgen, Golden, Colo., assignors to AcroMed Corporation, Cleveland, Ohio

Filed Jul. 29, 1987, Ser. No. 79,457
Int. Cl.[4] A61F *5/04*
U.S. Cl. 606—61 **7 Claims**



1. An apparatus for maintaining the relative positions of spinal bodies of a spinal column, said apparatus comprising:

a plate for connection with a first spinal body, said plate having a central axis and having first and second major side surfaces at least one of which is for facing the first spinal body, said first and second major side surfaces extending substantially parallel to each other, and being interconnected by a plurality of minor side surfaces ex-

tending transverse to said first and second major side surfaces;

surface means defining an opening extending through said plate between said first and second major side surfaces for receiving a fastener to connect said plate with the first spinal body;

a first rod fixedly connected to and extending from one of said plurality of minor side surfaces of said plate and being connectable with a second spinal body, said first rod being deformable for the purpose of conforming to a desired curvature of a portion of the spinal column; and

a connecting portion located between said first rod and said one minor side surface and having a transition zone of gradually changing cross section for minimizing stress loading in said connecting portion due to bending of said first rod.

4,887,596

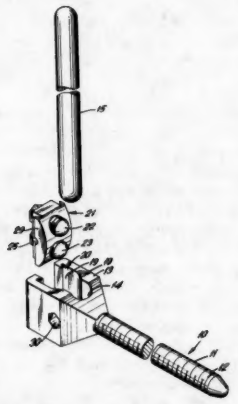
OPEN BACKED PEDICLE SCREW

Michael Sherman, King of Prussia, Pa., assignor to Synthes (U.S.A.), Paoli, Pa.

Filed Mar. 2, 1988, Ser. No. 163,278

Int. Cl.[4] A61F *5/04*

U.S. Cl. 606—61 **8 Claims**



1. A pedicle screw comprising a shaft having a forward end, a rear end and a longitudinal axis, said forward end being threaded for insertion into a bone and said rear end having a yoke attached thereto, the interior wall of said yoke nearest the shaft having a projection comprising two tapered walls forming an edge, said edge of said projection being adapted to bear against a rod inserted into the yoke, and means in said yoke for clamping a rod inserted in said yoke against said edge.

4,887,597

NOSE PLUG

Bruce K. Holland, 2323 N. Woodlawn, #179, Wichita, Kans. 67220

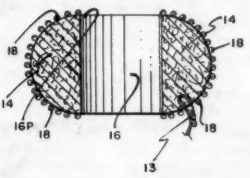
Filed Jul. 14, 1988, Ser. No. 218,968

Int. Cl.[4] A61G *10/00*

U.S. Cl. 128—206.11 **19 Claims**

19. A nasal depository for absorbing mucus and the like comprising at least one absorbent means for absorbing fluids when contacted by the fluids; at least one hollow member formed from a material different than the material of said absorbent means with a pair of open ends extending through the absorbent means such that the open ends are unobstructed by the absorbent means; and a perforated body member surrounding said absorbent means and being supported by the same;

said open ends of the hollow member define a first opening circumscribed by a first perimetrical body structure and a second opening circumscribed by a second perimetrical body structure; and



said perforated body member is secured to said first perimetrical body structure and to said second perimetrical body structure such as to unobstruct said first opening and said second opening.

4,887,598

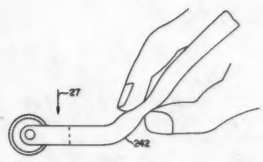
MANUAL ROTARY SCALPEL STRUCTURE

Joseph J. Berke, 3333 E. Jefferson Ave., Detroit, Mich. 48214

Division of Ser. No. 422,847, Sep. 24, 1982, Pat. No. 4,791,928. This application Mar. 9, 1987, Ser. No. 23,650

Int. Cl.[4] A61B *17/32*

U.S. Cl. 606—180 **9 Claims**



2. Manual rotary scalpel structure for making a surgical incision comprising a circular scalpel blade and elongated free handle means for holding the scalpel blade for rotating free of any other structure while drawing it across an area and along a line wherein an incision is desired while the scalpel blade is rotated only due to frictional resistance of the tissue in which an incision is being made to the passage of the circular scalpel blade therethrough wherein the handle means of the manual rotary scalpel has a longitudinal axis and is offset vertically and at an oblique angle to the longitudinal axis adjacent the circular scalpel blade to provide a clean field of vision for the surgeon.

4,887,599

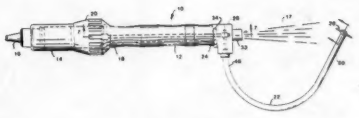
POWERED ROTARY SCALPEL STRUCTURE

George H. Muller, Apt. 508 M2, 1945 Gulf of Mexico Dr., Longboat Key, Fla. 34228

Continuation-in-part of Ser. No. 422,847, Sep. 24, 1982, Pat. No. 4,791,928. This application Jul. 28, 1987, Ser. No. 79,033

Int. Cl.[4] A61B *17/32*

U.S. Cl. 606—180 **48 Claims**



26. Rotary scalpel structure for making a surgical incision comprising means for holding a scalpel blade and drawing it

across an area and along a line where an incision is desired including a handle for gripping the rotary scalpel structure in use, an arcuate blade support arm at one end of the handle, means connected between the blade support arm and the one end of the handle for releasably securing one end of the blade support arm to the one end of the handle, means for rotatably securing a rotary scalpel blade to the other end of the blade support arm, and power drive means for rotating the scalpel blade while it is being held and drawn across an area and along a line where an incision is desired including a motor secured to the other end of the handle.

4,887,600

USE OF LASERS TO BREAK DOWN OBJECTS

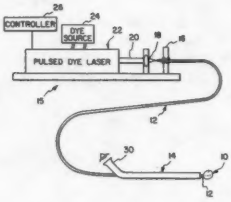
Graham Watson, London, England, and Horace Furumoto, Wellesley, Mass., assignors to The General Hospital Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 726,472, Apr. 24, 1985. This application Apr. 22, 1987, Ser. No. 41,158

Claims priority, application Israel, Apr. 22, 1986, 78567

Int. Cl.[4] A61B *17/00*

U.S. Cl. 606—128 **35 Claims**



1. Apparatus adapted for use in breaking down material for removal from within a body characterized in that it comprises:

means for surrounding the material with liquid; and

means for illuminating a localized region of the material using an optical fiber having a diameter between 60 microns and 600 microns and a pulsed laser of pulse duration between about 0.05 microsecond and 10 microseconds while the material is surrounded in liquid at such wavelengths and with energy per pulse between 5 millijoules and 200 millijoules and intensity at the localized region of at least 5 megawatts per square centimeter to cause in the operation of the apparatus fragmentation of the material without delivering energy sufficient to cause significant damage to other tissue in the vicinity of said material.

4,887,601

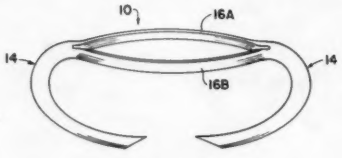
ADJUSTABLE SURGICAL STAPLE AND METHOD OF USING THE SAME

William D. Richards, Medway, Mass., assignor to Ophthalmic Ventures Limited Partnership, Norwood, Mass.

Filed Nov. 6, 1987, Ser. No. 118,746

Int. Cl.[4] A61B *17/04*; F16B *15/00*

U.S. Cl. 606—219 **20 Claims**



1. An adjustable surgical staple comprising a spine and two curved legs formed integral with opposite ends of said spine, and a slot extending along the length of the spine, said slot extending fully through said spine.

4,887,602

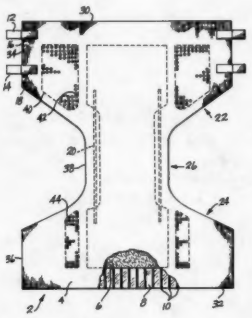
VENTILATED DIAPER OR INCONTINENT GARMENT

Audrey A. O'Leary, Belfair, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Jan. 11, 1988, Ser. No. 142,165

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—305.1 **10 Claims**



1. An incontinent garment or diaper comprising a moisture permeable body contacting cover sheet, a moisture and vapor impermeable backing sheet, and a moisture absorbing pad disposed therebetween, the cover and backing sheets being generally coextensive and the pad being of smaller dimensions and located so that a pad free flange encircles the garment,

said garment being of generally hour glass-shaped outline having front and rear end portions, adapted to encircle, respectively, the back and abdominal zones of the waist of a wearer, and a constricted central portion located therebetween adapted to fit the crotch zone of a wearer, said end portions having transverse and longitudinal margins,

said opposite sides of each end portions defining generally trapezoidally shaped, pad-free wing-like portions comprising part of said flange, and

ventilating apertures located only in discrete areas of at least the backing sheet of each of the wing-like portions at least at one end portions of the garment, said discrete areas being within boundaries of the absorbent pad and the transverse and longitudinal margins of the end portions of the garment.

4,887,603

MEDICAL STIMULATOR WITH STIMULATION SIGNAL CHARACTERISTICS MODULATED AS A FUNCTION OF STIMULATION SIGNAL FREQUENCY

Peter L. Morawetz, Minneapolis, and Zosim Ioffe, St. Paul, both of Minn., assignors to Empi, Inc., Fridley, Minn.

Division of Ser. No. 757,705, Jul. 22, 1985, abandoned. This application Jan. 27, 1988, Ser. No. 148,977

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—422 **26 Claims**

1. A transcutaneous electrical nerve stimulation (TENS) apparatus comprising:

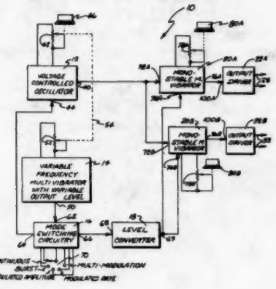
first oscillator means for producing a first train of pulses at a main frequency;

second oscillator means for producing a second train of pulses at a modulation frequency, the second oscillator means causing levels of the second train of pulses to vary as a function of the modulation frequency;

frequency control means for simultaneously controlling the

main frequency of the first train of pulses and the modulation frequency of the second train of pulses;

third oscillator means responsive to the first and second oscillator means for producing a third train of pulses having the main frequency of the first train of pulses, and causing intensity of pulses of the third pulse train to be



determined as a function of the signal levels of the second train of pulses; and

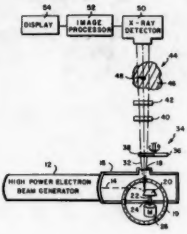
output driver means responsive to the third oscillator means for converting the third train of pulses into a train of stimulation signal pulses having electrical characteristics adapted to be applied to a human body to suppress pain.

4,887,604

APPARATUS FOR PERFORMING DUAL ENERGY MEDICAL IMAGING

Ruth Shefer, Waban; Robert E. Klinkowstein, Winchester, and Richard Petrasso, Cambridge, all of Mass., assignors to Science Research Laboratory, Inc., Somerville, Mass.

Filed May 16, 1988, Ser. No. 194,190
Int. Cl.[4] A61B *6/00*
U.S. Cl. 128—654 **21 Claims**



1. A dual energy medical imaging system for imaging a body part through which a radio-opaque dye is flowing, said dye having a predetermined K-edge energy level, comprising:

an electron beam target having a target surface which, when excited by a high-energy electron beam, generates a radiation output having strong K_α lines at energy levels slightly above and slightly below the K-edge energy level of the dye;

means for appling an electron beam to excite said target, said beam having sufficient energy to provide a high photon yield at the K_α line energy levels and sufficient power to obtain the photon fluence required for a medical imaging application;

filter means for selectively either filtering or passing unfiltered at least one of the K_α lines in the radiation output from the excited target surface;

an x-ray detector;

means for passing the output of said filter means with both said at least one K_α line filtered and said at least one K_α line unfiltered through the body part being imaged to said x-ray detector; and

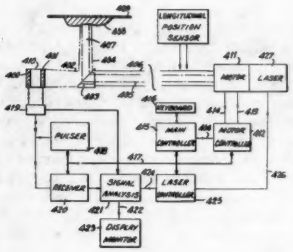
means for processing the energy received at the detector in response to the filtered and unfiltered outputs from the filtering means to obtain an image of the body part.

4,887,605

LASER CATHETER DELIVERY SYSTEM FOR CONTROLLED ATHEROMA ABLATION COMBINING LASER ANGIOPLASTY AND INTRA-ARTERIAL ULTRASONIC IMAGINING

Bjorn A. J. Angelsen, Anders Tvereggens veg 34, 7000 Trondheim, and David Linker, Kofoedgeilan 10 A, 7018 Trondheim, both of Norway

Filed Feb. 18, 1988, Ser. No. 157,407
Int. Cl.[4] A61B *8/12, 17/36*
U.S. Cl. 128—660.03 **12 Claims**



1. An intra-arterial laser angioplasty catheter, comprising:

an elongated catheter tube for intra-arterial insertion and extension to an angioplasty site and having a distal end for operative disposition proximate the angioplasty site;

optical fiber means extending along and within said tube for transmitting laser irradiation to the distal end of the catheter tube for selective tissue ablation;

ultrasound transducer means proximate the distal end of said tube for emitting a pulsed ultrasound beam toward tissue at the angioplasty site and for receiving ultrasound reflections of said emitted beam to thereby provide intra-arterial imaging of tissue structures;

means proximate the distal end of said tube for directing said laser irradiation from the catheter in a first direction and for directing said emitted ultrasound beam from the catheter in a second direction, said first and second directions having a fixed angular relation therebetween; and

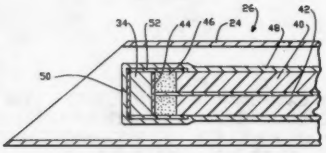
means operable for rotating said directing means relative to said catheter tube so as to concurrently selectively vary said first and second directions while maintaining said fixed angular relation therebetween and thereby selectively steer said emitted ultrasound beam and laser irradiation toward tissue structures for imaging and ablation, respectively, thereof, whereby said intra-arterial imaging enables steering of said laser irradiation by selective rotation of said directing means to guidedly direct the laser irradiation for intra-arterial tissue ablation in accordance with the imaging provided by said ultrasound beam.

4,887,606

APPARATUS FOR USE IN CANNULATION OF BLOOD VESSELS

Paul G. Yock, 25 Cerritos Ave., San Francisco, Calif. 94127, and Alan R. Selfridge, 2592 Middlefield Rd., Palo Alto, Calif. 94301

Continuation of Ser. No. 908,556, Sep. 18, 1986, abandoned. This application Jan. 11, 1989, Ser. No. 296,272
Int. Cl.[4] A61B 5/12
U.S. Cl. 128—662.05 6 Claims



1. Apparatus for use in cannulation of blood vessels comprising

a hollow needle having a sharpened end for penetrating tissue,

a stylet positioned within said needle and including an ultrasound transducer at one end for transmitting and receiving ultrasonic waves through the sharpened end of said needle,

a support rod for supporting said transducer,

means attaching said transducer to said support rod,

coaxial electrical conductors associated with said support rod for transmitting electrical signals to and from said transducer, including a wire extending through said support rod electrically connected with a back surface of said transducer, and a metal conductor on the surface of said rod electrically interconnected with a front surface of said transducer, said metal conductor and support rod being spaced from said needle to facilitate back flow of blood when a blood vessel is penetrated, and

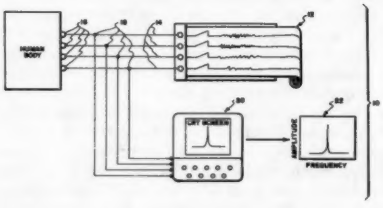
a syringe portion detachably attached to said needle.

4,887,607

APPARATUS FOR AND METHOD OF SPECTRAL ANALYSIS ENHANCEMENT OF POLYGRAPH EXAMINATIONS

Robert F. Beatty, 7927 Marquand Ave., West Hills, Calif. 91304

Filed Mar. 16, 1988, Ser. No. 169,224
Int. Cl.[4] A61B 5/02
U.S. Cl. 128—670 4 Claims



1. A polygraph examination apparatus comprising in combination:

a polygraph machine including input leads adapted to be connected to the human body so that the specific human body functions of galvanic skin response, blood pressure, respiration, and pulse and their associated output signals can be monitored; and

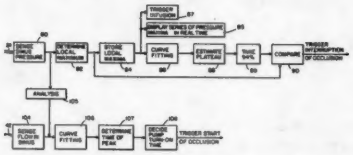
a spectrum analyzer electronically connected in parallel with said polygraph machine such that the output signals of the human body functions being monitored on said polygraph machine are concurrently monitored on said spectrum analyzer.

4,887,608

METHOD AND APPARATUS FOR ESTIMATING TISSUE DAMAGE

Werner Mohl, Vienna, Austria, and Marc J. Tolkoff, Brookline, Mass., assignors to Boston Scientific Corporation, Watertown, Mass.

Division of Ser. No. 824,721, Jan. 31, 1986, which is a continuation-in-part of Ser. No. 583,753, Feb. 27, 1984, abandoned. This application Jan. 10, 1989, Ser. No. 295,750
Int. Cl.[4] A61B 5/02
U.S. Cl. 128—673 6 Claims



1. Apparatus for analyzing the degree of tissue damage in a heart subjected to inadequate arterial blood flow comprising

means for intermittently occluding the coronary sinus of said heart,

a pressure transducer for sensing the pressure within said sinus and providing corresponding fluid pressure signals, and

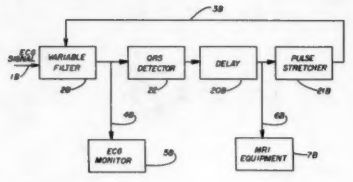
means for estimating the amount of said tissue at risk of infarction on the basis of said fluid pressure signals.

4,887,609

APPARATUS AND METHOD FOR FILTERING ELECTROCARDIOGRAPH SIGNALS

Malcolm P. Cole, Jr., Houston, Tex., assignor to The Methodist Hospital System, Houston, Tex.

Filed May 13, 1987, Ser. No. 49,668
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—696 15 Claims



1. An apparatus for filtering unwanted electrical signals from an electrocardiograph signal of a patient comprising:

means for filtering an input electrocardiograph (ECG) signal of a patient and for providing an output signal therefrom;

means for transmitting a synchronization signal indicating a biophysical state of said patient to said filtering means; and

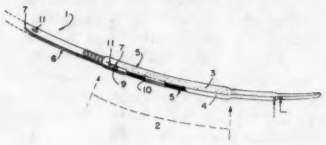
means responsive to said synchronization signal for varying said filtering means wherein said synchronization signal is used to select predetermined filtering characteristics, and wherein said filtering means comprises a plurality of low pass filters and wherein said plurality of low pass filters comprises one low pass filter with a 3dB point of approximately fifty (50) Hertz and one low pass filter with a 3dB point of approximately five (5) Hertz.

4,887,610

DEVICE TO MEASURE ELECTRICAL AND MECHANICAL EVENTS IN THE HUMAN SPHINCTERS

Ravinder K. Mittal, Charlottesville, Va., assignor to University of Virginia Alumni Patents Foundation, Charlottesville, Va.

Filed Oct. 19, 1988, Ser. No. 259,595
Int. Cl.[4] A61B 5/10
U.S. Cl. 128—733 18 Claims



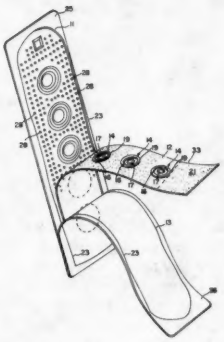
1. A device for measuring physical pressure charges and electrical changes in a sphincter comprising a catheter which has a pressure sensing means for sensing pressure changes and electrical sensing means for sensing electrical changes, wherein the pressure sensing means and the electrical sensing means are located in a same area on the catheter, but on different sides of the catheter so that the measuring of physical changes and electrical changes take place simultaneously at a given point of the sphincter.

4,887,611

PLASTER FOR CONDUCTING SKIN PATCH TESTS

Günther Rüdiger, Reinbek, and Ulf Peters, Büchen, both of Fed. Rep. of Germany, assignors to MIT Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 892,172, Aug. 1, 1986, abandoned. This application Feb. 3, 1988, Ser. No. 151,768
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1985, 3527893
Int. Cl.[4] A61B 15/00
U.S. Cl. 128—743 12 Claims



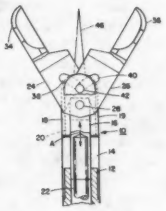
1. A plaster package utilized for skin patch tests comprising: a plaster which is ready for use for skin patch tests, the plaster having a plurality of occlusion chambers of aluminum lined with a thin film of inert plastic, each of the occlusion chambers containing a test allergen, each of which allergens is in a semi-liquid vehicle with doses of defined volume, and means for enveloping the plaster and occlusion chambers in a protective pack said enveloping means being defined by a pair of opposed foils bonded together with a hermetic seal and containing the plaster and occlusion chambers therebetween.

4,887,612

ENDOSCOPIC BIOPSY FORCEPS

Theodor Esser, Stony Brook, and Thomas E. Doherty, Setauket, both of N.Y., assignors to Esco Precision, Inc., Stony Brook, N.Y.

Filed Apr. 27, 1988, Ser. No. 186,564
Int. Cl.[4] A61B 10/00
U.S. Cl. 128—751 7 Claims



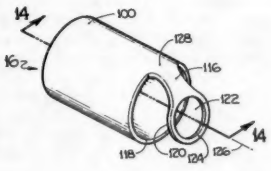
1. A biopsy forceps device which is insertable through an endoscope into a body cavity for the separation of tissue therefrom; said forceps device comprising a flexible tubular sheath; a housing member secured to one end of said sheath and having a slot extending therethrough; a wire extending coaxially within said sheath for telescoping movement relative thereof; a movable member slidably supported in the slot of said housing member and being fastened to said wire; a pair of forceps levers each having a shank portion said shank portions having opposite ends and an operating jaw extending from one end of said shank portion; means at the opposite end of each said shank portion of each said lever for articulating said forceps levers to said movable member, a cam track consisting of a slot formed in each shank portion intermediate the ends thereof; and a single stationary pivot means extending through said slot in each said lever shank portion and being fixedly connected to said housing member, each of said cam tracks having opposite surfaces of said shank slot movably guided along said stationary pivot means whereby axial displacement of said movable member relative to said housing member responsive to axial movement of said wire in said sheath causes said slots to move in camming surface contact along said stationary pivot means and to pivot said forceps levers into respective opening and clamping movements of the clamping jaws on said forceps levers.

4,887,613

CUTTER FOR ATHERECTOMY DEVICE

Andrew F. Farr, Spring Valley, and Herbert R. Radisch, Jr., San Diego, both of Calif., assignors to Interventional Technologies Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 123,713, Jan. 23, 1987. This application Jun. 30, 1988, Ser. No. 213,691
Int. Cl.[4] A61B 10/00
U.S. Cl. 606—159 10 Claims



1. A rotatable cutter for excising obstructive tissue from a lumen of a blood vessel which comprises:

a hollow cylindrical base;

a hollow cylindrical tip coaxially distanced from said base and having a diameter less than that of said base;

a hollow frustum coaxially aligned intermediate and respectively attached to said base and said tip, said frustum formed with a first opening and a second opening to establish a rigid first blade and a rigid second blade, said first and second blades respectively having a first cutting edge and a second cutting edge substantially diametrically opposed to said first cutting edge and wherein said first opening is larger than said second opening to establish said first edge longer than said second edge;

a guide wire insertable through said base and said tip for guiding said cutter along a predetermined path; and

means fixedly attached to said base for rotating said cutting edges of said cutter in the same rotational direction to alternately engage said first and second edges with obstructive tissue and establish a differential cutting action between said edges to incline the axis of rotation of said cutter relative to said guide wire.

4,887,614

MEDICAL ELECTRODE DEVICE

Toshiharu Shirakami, Hino, and Akira Sogawa, Tokyo, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 158,133, Feb. 17, 1988, abandoned, which is a continuation of Ser. No. 918,627, Oct. 14, 1986, abandoned, which is a continuation of Ser. No. 645,105, Aug. 28, 1984, abandoned. This application Apr. 18, 1989, Ser. No. 339,875

Claims priority, application Japan, Sep. 5, 1983, 58-163046

Int. Cl.[4] A61N *1/06*

U.S. Cl. 128—798 **9 Claims**

1. A medical electrode device for use in radio-frequency hyperthermia comprising:

(a) a flexible bag-like member comprising:

(i) an inner sheet-like member and

(ii) an outer sheet-like member having a flat shape,

(iii) an inner shape being defined between said inner and outer sheet-like members,

(iv) said flexible bag-like member comprising at least first, second, and third partitioning portions forming a zig-zag passage in said inner space,

(v) said first, second, and third partitioning portions each being formed by securing said inner sheet-like member to said outer sheet-like member,

(vi) said inner sheet-like member and said outer sheet-like member making substantially only line contact with each other where they are secured to each other,

(vii) said inner sheet-like member being adapted to be in direct contact with a living body during use of said medical electrode device,

(viii) said first and second partitioning portions continuously extending in parallel to each other from a first peripheral edge of said bag-like member in the direction of a second peripheral edge opposite to said first peripheral edge,

(ix) said third partitioning portion continuously extending between said first and second partitioning portions in parallel to said first and second partitioning portions from said second peripheral edge in the direction of said first peripheral edge,

(x) said first, second, and third partitioning portions being substantially narrower than said zig-zag passage in width;

(b) means for circulating a cooling medium through said zig-zag passage;

(c) a flexible electrode secured closely onto said outer sheet-like member of said flexible bag-like member such that said flexible bag-like member is disposed between said flexible electrode and the living body during use of said medical electrode device; and

(d) a fixing belt disposed behind said flexible electrode for uniformly pressing the medical electrode device against the living body so that said flexible electrode spaces substantially in parallel with the surface of the living body, wherein, upon introduction of the cooling medium into said zig-zag passage;

(e) said outer sheet-like member maintains substantially a flat shape;

(f) said inner sheet-like member inflates to form a corrugated shape; and

(g) the corrugations in said inner sheet-like member touch each other on their sides and the inner surface of the corrugations is substantially continuous so as to make a uniform contact with an outer surface of said living body during use of said medical electrode device.

4,887,615

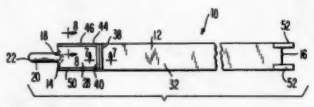
STERILE DRAPE FOR ULTRASOUND PROBE

Richard H. Taylor, Columbus, Miss., assignor to Microtek Medical Inc., Columbus, Miss.

Filed Dec. 28, 1988, Ser. No. 291,111

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—850 **30 Claims**



1. A sterilizable drape for enclosing an ultrasound probe during an ultrasound procedure, said drape comprising:

an elongated sleeve member formed of a sterilizable, flexible, fluid impervious material and including a first elongated tubular portion having open first and second ends and a second portion formed of a rectangular member having a circular fenestration at substantially the center thereof, said second portion being folded longitudinally and having the two longitudinal ends thereof connected to one end of said first portion and having each of the rectangular member sides sealed together to provide an extension of said first member, forming said sleeve member with an open first end and a substantially closed second end with the circular fenestration therethrough; and

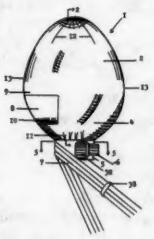
a tubular member having a diameter substantially equal to the diameter of the fenestration and formed of a sterilizable, flexible, resilient, fluid impervious material, and having an open first end, sealed to said sleeve member second end and communicating with said sleeve member fenestration, and a closed second end.

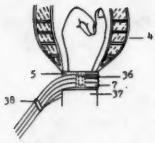
4,887,616

RESTRAINT MITT FOR RESTRAINING A WEARER'S HAND AND ARM

Etienette Baijnath, No. 609 - 120 Raglan Avenue, Toronto, Ontario, M6C 214, Canada

Filed Dec. 29, 1986, Ser. No. 947,289
Claims priority, application Canada, Dec. 30, 1985, 498,718
Int. Cl.[4] A61F 13/00
U.S. Cl. 128—879 1 Claim





1. A restraint mitt for restraining a wearer's hand and arm comprising:

(a) a fingerless mitt comprised of a wall sufficiently firm to maintain its shape and to prevent the wearer from grasping objects external to the mitt, said wall enclosing a concave cavity, the top and bottom ends of said cavity being narrowed in relation to the cavity's middle portion, said cavity being adapted to contain a wearer's hand while permitting the wearer's hand to be relatively freely movable therein;

(b) a durable protective cover covering the outside of the wall of the mitt and a durable absorbent lining, lining the cavity of said wall;

(c) retaining means at the bottom end of the mitt comprised of a durable cuff open on one side and having a compression-reducing under layer to reduce compression on the wearer's wrist;

(d) noninjurious securing means on said cuff comprising hook and loop fastening means for closing the open side of the cuff, a buckle and a security strap fixed to the cuff, wherein the security strap is adapted to be threaded through the buckle in such a manner that the security strap will not slip out of the buckle;

(e) restraining means comprised of a restraining strap having an intermediate point fixed to the cuff, said restraining strap having a tab loop holding the restraining strap together near the cuff, wherein part of the restraining strap passes through the tab loop securing the restraining strap around the cuff and two free parts of the restraining strap beyond the tab loop are adapted to be secured to a fixed structure;

(f) and means for storing the two free parts of the restraining strap, when they are not attached to a fixed structure, comprising a patch pocket secured to the cover of the mitt, said pocket having an elasticised mouth for retaining the free parts of the restraining strap therein.

4,887,617

TOBACCO PRODUCT FOR THE PERSONAL PREPARATION OF A CIGARETTE, IN PARTICULAR FILTER CIGARETTE

Heinrich W. Ruppert, and Klaus G. Gätschmann, both of Trossingen, Fed. Rep. of Germany, assignors to EFKA-Werke Fritz Kiehn GmbH, Fed. Rep. of Germany

Filed Dec. 21, 1987, Ser. No. 136,901
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3644047; Jan. 8, 1987, 3700420
Int. Cl.[4] A24C 5/00
U.S. Cl. 131—70 15 Claims

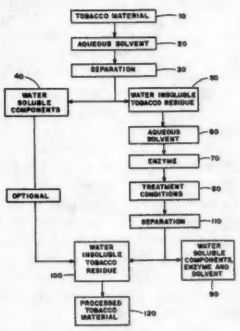
1. A tobacco product for the personal preparation of a cigarette including an inherently stable tobacco portion (10) filling an outer wrapping (13) consisting of a completely smokeable material, said wrapping being permeable to air such that smoking the tobacco portion (10) requires an airtight outer cover (11), the diameter of the wrapped tobacco portion (10, 13) being less than the inner diameter of the outer covering, comprising said tobacco portion (10) including smokeable material automatically expanding and thereby increasing the diameter of the tobacco portion to move into tight engagement with said cover at least in the region of the glowing area (17) as the result of smoking the cigarette.

4,887,618

TOBACCO PROCESSING

Edward Bernasek, Winston-Salem; Kenneth A. Bridle, Walnut Cove; William L. Clapp, and Barry S. Fagg, both of Winston-Salem, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 19, 1988, Ser. No. 195,985
Int. Cl.[4] A24B 15/00
U.S. Cl. 131—297 18 Claims



1. A process for reducing the protein content of tobacco material, the process comprising:

(i) extracting components from tobacco material with a solvent having an aqueous character; and then

(ii) separating extracted tobacco components from extracted tobacco material; and then

(iii) subjecting the extracted tobacco material to aqueous enzyme treatment in the presence of a liquid having an aqueous character and in the presence of a protease to decompose essentially water insoluble protein compo-

nents of the tobacco material to water soluble and/or water dispersible fragments; and then

(iv) separating the extracted tobacco material of step (iii) from the liquid, the protease and the water soluble and/or water dispersible fragments.

4,887,619

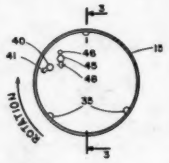
METHOD AND APPARATUS FOR TREATING PARTICULATE MATERIAL

Walter E. Burcham, Jr., Yadkinville, and Wilbur J. French, Jr., Walkertown, both of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Continuation-in-part of Ser. No. 936,050, Nov. 28, 1986, Pat. No. 4,730,627. This application Aug. 10, 1987, Ser. No. 83,396

Int. Cl.[4] A24B *3/04, 3/12*

U.S. Cl. 131—305 **13 Claims**



1. Improved apparatus for treating particulate material with a liquid additive comprising in combination

(a) an elongated rotatable cylinder whose longitudinal axis is disposed in a substantially horizontal position and having an entrance end for introducing particulate material into the cylinder and an exit end for discharging treated particulate material, said cylinder also having an inner wall that has associated therewith a plurality of flights designed to enhance the lifting action exerted on the particulate material as it is carried upwardly to a predetermined point by the portion of the inner wall that is rising during rotation of the cylinder,

(b) means for rotating said elongated rotatable cylinder at a speed that is sufficient to cause said particulate material to be carried upwardly to said predetermined point before falling downwardly due to gravitational forces and thereby to confine a major portion of the particulate material in a zone that is contiguous to the portion of the inner wall that is rising during rotation of the cylinder,

(c) a group of stationary nozzles arranged adjacent to the inner wall of the cylinder with the nozzles in said group of stationary nozzles extending in a longitudinal direction along a substantial length of the inner wall of the cylinder and being oriented so that fluid streams emerging from the nozzles impinge obliquely against a portion of the inner wall that is rising during rotation of the cylinder at or above said predetermined point and in a direction that is substantially opposite to the direction of movement of said inner wall thereby causing any particulate material adhering to the rising inner wall to be dislodged therefrom, said fluid streams emerging from the nozzles also serving to augment the agitation action resulting from the gravitational effect on the particulate material that has temporarily separated from the rising inner wall,

(d) a plurality of liquid additive spray nozzles strategically positioned within the cylinder at a location that permits liquid additive supplied to the spray nozzles to be directed into the zone where the major portion of the particulate material is confined by gravity and the rotational movement of the cylinder during its passage through the cylinder,

(e) means for supplying a pressurized fluid to said group of stationary nozzles,

(f) means for monitoring the feed rate of particulate material introduced into the entrance end of the cylinder and

(g) first additive supply means for supplying regulated quantities of a first liquid additive to a selected spray nozzle in said plurality of liquid additive spray nozzles and a second additive supply means for supplying regulated quantities of a second liquid additive to a spray nozzle in said plurality of liquid additive spray nozzles other than said selected spray nozzle.

4,887,620

COMPOSITION AND METHOD TO PROVIDE ORGANOLEPTIC BITE IN A COMPOSITION FOR HUMAN CONSUMPTION

John K. Summers, Anderson, Ind., assignor to Better Life International, Inc., Stuart, Fla.

Filed Apr. 26, 1988, Ser. No. 186,395

Int. Cl.[4] A24B *15/30*

U.S. Cl. 131—352 **22 Claims**

1. A chewing and/or snuff composition including a nicotine-free herb capable of being encased and capable of being processed to a texture which is non-injurious to the surface of the oral cavity, and a casing material for combining with said herb which maintains said herb is a moist coherent cud during chewing comprising:

cayenne pepper having a particle size with level of grind from about #30 Duraloy (#20 U.S.) to about #58 Duraloy (#48 U.S.) in an amount sufficient to approximate the bite sensation of a tobacco-containing chewing composition.

4,887,621

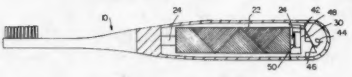
COMBINATION TOOTHBRUSH AND DENTAL FLOSS HOLDER

Louis Vallieres, 5470 Braesvalley #322, Houston, Tex. 77096

Filed May 2, 1988, Ser. No. 189,083

Int. Cl.[4] A45D *44/18*

U.S. Cl. 132—309 **6 Claims**



1. A combination toothbrush and dental floss holder, comprising:

a body having first, second and third parts,

said first part being a toothbrush attachment,

said second part having first and second ends and including a cavity for receiving a spool of dental floss, said first end releasably connected to the toothbrush attachment, said second part including a first dental floss guide adjacent the first end for rotatably supporting one end of a spool of dental floss,

said third part being a cap for attachment to the second end of the second part,

a support platform having first and second sides and releasably attached to the second end of the second part by a first threaded connection and releasably attached to the cap by a second threaded connection, said first side of the platform including a second dental floss guide for rotatably supporting a second end of a spool of dental floss, said platform including a dental floss opening for the passage of dental floss from the first side to the second side of the platform,

a cutter positioned on the second side of the support platform for cutting the dental floss,

a resilient washer positioned on the second dental floss guide for supporting the second end of a dental floss spool, and

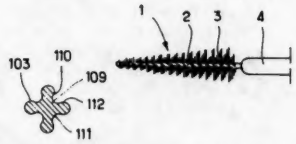
a low friction washer positioned on the second dental floss guide adjacent to said resilient washer for engaging the second end of a dental floss spool.

4,887,622

BRUSH FOR THE APPLICATION OF MASCARA TO THE EYELASHES

Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

Filed Nov. 30, 1987, Ser. No. 126,324
Claims priority, application France, Nov. 28, 1986, 86 16626
Int. Cl.[4] A46D 1/00
U.S. Cl. 132—320 13 Claims



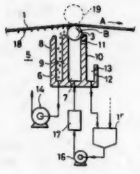
1. A brush for the application of mascara to the eyelashes, comprising a central core formed from a twisted wire holding a helical array of regularly disposed bristles with a bristle diameter of from 0.10 to 0.25 mm and with from approximately 10 to 40 bristles per turn of the helix.

4,887,623

APPARATUS FOR REMOVING PARTICLES FROM A FLEXIBLE SUPPORT

Tuyoshi Sugiyama; Hideo Takeda; Tsunehiko Sato, and Hiroshi Chikamasa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 901,500, Aug. 28, 1986. This application Jul. 1, 1987, Ser. No. 68,294
Claims priority, application Japan, Sep. 12, 1985, 60-200662; Sep. 12, 1985, 60-200663
Int. Cl.[4] B08B 1/02
U.S. Cl. 134—64 R 10 Claims



1. A cleaning apparatus for removing particles from a flexible sheet, comprising:

means for running a flexible sheet in a first detection past a first position;

a rotatable rod member disposed adjacent said flexible sheet at said first position;

drive means for rotating said rod member at said first position in a direction opposite said first direction;

a block having a vertical first slit holding a solvent and rotatably supporting said rod member at a top of said first slit; and

means for supplying said solvent to said first slit,

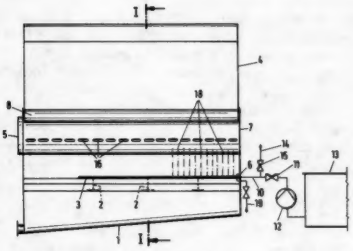
wherein said rod member has an outer circumferential surface comprising carbide of a surface roughness in a range from about 0.05 micrometers to 1 micrometers.

4,887,624

APPARATUS FOR TREATING THE INSIDE SURFACE OF TUBULAR MEMBERS WITH LIQUID

Detlev Eggers, Neu-Anspach, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 17, 1989, Ser. No. 297,904
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802428
Int. Cl.[4] B08B 9/02
U.S. Cl. 134—98 5 Claims



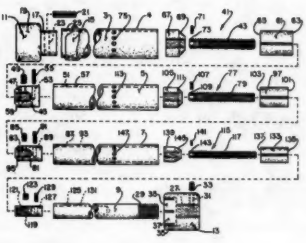
1. An apparatus for treating an inside surface of tubular members with liquids, comprising a treating container including supports for holding the tubular members in a longitudinal direction, nozzles connectable to one end of each tubular member when supported in the container; supply lines for supplying liquids to the nozzles; wherein the container further comprises a cover at a front longitudinal wall of the treating container parallel to the longitudinal direction and above the supports for the tubular members, means mounting the cover for pivotal movement about an axis parallel to the longitudinal direction and upwardly from a closed position to an open position; an exhausting device extending throughout the length of the treating container in the longitudinal direction and disposed in an upper portion of the treating container, and wherein the nozzles are disposed on the inside of the one side wall of the treating container, wherein the one side wall is perpendicular to the longitudinal direction and each nozzle has means for slidably receiving one end of each tubular member to dispose each nozzle coaxial with the received tubular member.

4,887,625

COLLAPSIBLE CANE

Arvo T. Archer, County of St. Louis, Mo., assignor to Americane, Inc., Maryland Heights, Mo.

Filed May 26, 1988, Ser. No. 200,055
Int. Cl.[4] A45B 9/00
U.S. Cl. 135—75 21 Claims



1. A collapsible cane having a series of longitudinal interfit-

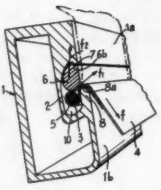
ting telescoping sections from smallest to largest which are interlocked together when collapsed and interlocked against collapse when extended including, first interlocking means for externally interlocking said interfitting telescoping sections together as a unit when collapsed, said first interlocking means comprising a cane tip mounted at an outer free end of the smallest telescoping section and including external gripping means in the form of a resiliently expandable collar portion for engaging the largest telescoping section while all remaining telescoping sections are telescopically collapsed within the largest telescoping section so as to retain the interfitting telescoping sections together as a unit when telescopically collapsed, said first interlocking means including said cane tip external gripping means and its resiliently expandable collar portion being selectively disengaged from said largest interfitting telescoping section to permit longitudinal extension of said interfitting telescoping sections and second interlocking means for internally interlocking adjacent telescoping sections together against collapse when activated, and when de-activated enabling collapse and telescopic interfitting assembly of adjacent interfitting telescopic sections relative to one another from subsequent re-engagement with the first interlocking means.

4,887,626

STRETCHED CLOTH FIXING DEVICE

Pierre Dalo, Z.I. du Bel-Air - Rue P. Métairie, 78120 Rambouillet, and Jean Dalo, 1, rue Beaurepaire, 91410 Roinville-sur-Dourdan, both of France

Filed Jan. 29, 1988, Ser. No. 150,398
Claims priority, application France, Jan. 30, 1987, 87 01157
Int. Cl.[4] E04B *1/347*; A44B *21/00*
U.S. Cl. 135—119 **16 Claims**



1. In a device for securing the lower edge of a tent canvas for a light shelter having a general pyramidal shape, the tent canvas having an edge for forming a stretched sheet when held by said device, said device comprising:

a horizontal extruded section having at least one vertical face provided with a groove opening;

said groove opening including an inlet slit with an upper lip and a lower lip, a groove interior comprising a groove bottom forming part of said groove interior for receiving the edge of a tent canvas having said edge for forming the stretched sheet after the edge passes through said inlet slit, said inlet slit having a width smaller than the width of said groove bottom;

a flexible rod engageable transversely in said groove, said sheet cooperating with said flexible rod and having an edge wrapped around said flexible rod forming a bead by being folded back onto itself about said flexible rod to form a double thickness of said sheet; said flexible rod being movable through said slit for engagement with said groove bottom with said bead formed from said double thickness of said sheet extending out of said slit;

a semi-rigid locking rod having one dimension less than the width of said inlet slit and another dimension greater than the width of said inlet slit movable through said inlet slit into said groove interior and rotated so that said greater dimension is above said groove bottom and said flexible rod with said sheet edge folded back onto itself to form said double thickness about said flexible rod for holding said flexible rod and said sheet edge in said groove opening, said sheet edge being positioned between said semi-rigid locking rod and said flexible rod;

said inlet slit including a first upper lip of small height and a second lower lip of large height, said two lips thus defining, rearwardly thereof and on each side of said inlet slit, respectively, on the side of the first upper lip, a first shallow channel and, on the side of the second lower lip, a second deeper channel;

said semi-rigid locking rod having a locked position and an unlocked position and having a thickness along said one dimension less than the width of the said inlet slit so that it can be inserted into said groove opening and having a rib which is jammed, in the locked position of said semi-rigid locking rod, into said first channel, said bead formed by said sheet wrapped around said flexible rod then being forced into and jammed into said second channel below said inlet; and

said locking rod extending between said bead and the sheet housed in said second channel and said first channel in a vertical locked position of said locking rod, and when in said vertical locked position being in a vertical position at right angles with respect to its horizontal unlocked insertion position of insertion into said groove opening and extending below said inlet slit to block said bead against said groove bottom;

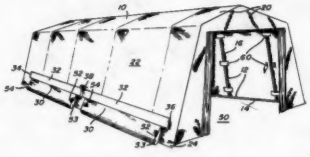
said locking rod including a lower rounded part for jamming said locking rod against said lower lip for joining together the internal and external faces of said locking rod, so that a tractive force exerted outwardly on the sheet does not allow said bead to escape from said groove opening and move through said inlet slit while at the said time clamping said sheet.

4,887,627

SHELTER WITH RELEASABLE BALLAST MEMBERS

Carol Audet, Laval, Canada, assignor to Les Piscines Et Abris Tempo, Inc., Laval, Canada

Filed Dec. 9, 1988, Ser. No. 281,727
Int. Cl.[4] E04H *15/32*
U.S. Cl. 135—120 **10 Claims**



1. A portable knock down shelter assembly having a skeleton frame structure of detachable tubular rib members and cross members and a covering complementary in shape to said structure, said shelter assembly defining a roof and substantially vertical walls having upper and lower portions with the lower portion adapted to be adjacent the ground when the shelter is assembled; one or more modular ballast members with each modular member being a separate container in the form of an elongated flat tube having closed ends and a fastening strip formed along an upper portion of the tube along the length thereof, inlet means in the so formed container adjacent the fastening strip for filling the container with ballast material; said lower portions of said walls being provided with attachment means for removably attaching said one or more ballast members to the walls of the shelter when assembled, said attachment means including engagement means located for engaging the fastening strip on the one or more ballast members whereby the one or more ballast members may be provided at predetermined locations on the lower portion of the

walls to anchor the walls and thus the shelter to the ground when the shelter is assembled.

4,887,628

FLUIDIC APPARATUS

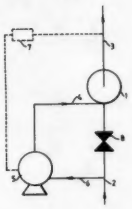
Michael J. Bowe, and Alistair L. Wright, both of Preston, United Kingdom, assignors to United Kingdom Atomic Energy Authority, London, United Kingdom

Filed Aug. 24, 1988, Ser. No. 236,015

Claims priority, application United Kingdom, Aug. 28, 1987, 8720300; Oct. 23, 1987, 8724918

Int. Cl.[4] F15C *1/16*

U.S. Cl. 137—8 4 Claims



1. A method of controlling flow in a flow line which comprises inserting a vortex amplifier in the flow line such that flow enters radially into the chamber of the vortex amplifier and emerges axially from the chamber, arranging a pump to deliver a control flow to the vortex amplifier and locating a pressure transducer in the flow line downstream of the vortex amplifier, utilizing signals generated by the pressure transducer in response to pressure changes in the flow line to control operation of the pump whereby to vary the control flow in response to changes in the pressure to thereby maintain a substantially constant pressure in the flow line downstream of the vortex amplifier.

4,887,629

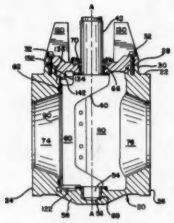
PLUG VALVE AND METHOD OF ASSEMBLY

A. Kenneth Wilson, Aurora, and John V. Ballun, Oswego, both of Ill., assignors to Amsted Industries Incorporated, Chicago, Ill.

Division of Ser. No. 259,901, Oct. 19, 1988. This application Jun. 12, 1989, Ser. No. 364,830

Int. Cl.[4] F16K *5/04*

U.S. Cl. 137—15 2 Claims



1. An improved method for assembling a plug valve wherein a valve closure member is enclosed by a cover member so as to be rotatable within a generally cylindrical cavity of a valve body so as to oppose one of an inlet and outlet rim in the cavity wall, said method comprising:

inserting a thin seat insert adjacent said one rim with said cavity;

also inserting said valve closure member within said cavity;

fitting a cover member to the top of said cavity, said cover member having a cam ledge adjacent a portion of its periphery said portion being initially placed generally opposite said one rim;

rotating said cover member in a direction to move said cam ledge against an upper edge of said thin seat insert, whereby to press said insert onto said one rim;

and securing said cover onto said valve body.

4,887,630

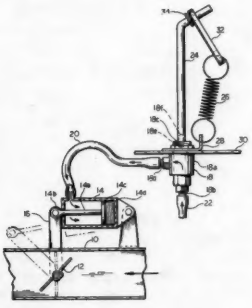
PNEUMATIC CONTROL SYSTEM FOR AIR HANDLING SYSTEM DAMPER

James R. Hill, Toledo, Ohio, assignor to Mestek, Inc., Westfield, Mass.

Filed Mar. 15, 1989, Ser. No. 324,249

Int. Cl.[4] F16K *17/38*

U.S. Cl. 137—72 33 Claims



27. In combination with a three-way valve for use between a source of fluid pressure and fluid pressure operator means, said three-way valve comprising a vent outlet, a valve member which is movable between a first position in which fluid is adapted to flow from the source of fluid pressure to the fluid pressure operator means and a second position in which fluid is adapted to flow from the fluid pressure operator means through the vent outlet, and biasing means normally biasing said valve member toward said second position:

restraining means comprising a fusible link normally restraining said valve member of said three-way valve in said first position, said fusible link being subject to failure in the event of a condition of excessive temperature, whereupon said biasing means will move said valve member to said second position, and the fluid will flow from the fluid pressure operator means through said vent outlet.

4,887,631

FIRE ISOLATION DEVICE

Alden E. Friend, Valencia, and Lawrence A. Dunham, Northridge, both of Calif., assignors to ITT Corporation, New York, N.Y.

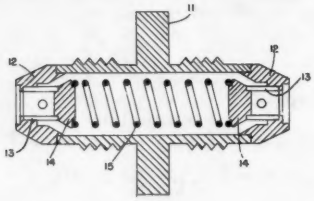
Filed Jan. 26, 1989, Ser. No. 302,506

Int. Cl.[4] F16K *17/38*

U.S. Cl. 137—74 20 Claims

1. A fire isolation device capable of operating at high temperatures such as 2000° F. for up to 15 minutes, the device having a passageway therethrough, a self closing valve having a stainless steel poppet and a stainless steel seat disposed in said passageway with said poppet mechanically biased toward said seat to a valve closed position closing the passageway through the device, a nose member in the form of a sleeve of fusible material having at least one aperture therethrough to provide a continuous fluid flow path through said device around said poppet and through said seat and being positioned to hold said valve in an open position against the bias on the poppet, said

seat having a flow path on its outer end dimensioned to fit said nose member and a flow path towards its inner end larger in diameter than said nose member in the area occupied by said at least one aperture to permit flow therethrough when said nose member holds said valve in an open position, said nose member



being of a material to melt prior to the melting of an attached component after which the nose member will collapse into said larger diameter permitting said bias to close the valve and the remainder of the parts of the device being made of higher temperature resistant material.

4,887,632

FLOW CONTROL APPARATUS

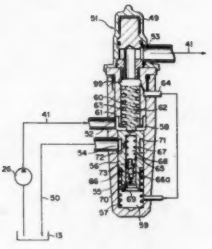
Tadao Tanaka; Takeshi Mitsui; Shozo Takizawa, and Kazuo Fukuyama, all of Okazaki, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 18, 1988, Ser. No. 195,590

Claims priority, application Japan, May 20, 1987, 62-75639[U]; Dec. 21, 1987, 62-193866[U]; Feb. 26, 1988, 63-24664[U]

Int. Cl.[4] G05D *11/00*; F16D *31/02*; B62D *5/06*

U.S. Cl. 137—117 **11 Claims**



1. A flow control apparatus for a hydraulic system, comprising:

inflow port means into which a working oil flows;

outflow port means from which the working oil flows; and

return port means for returning part of the working oil to the inflow side of the apparatus;

elongate throttling path means comprising spiral choke means spirally extending between the inflow and outflow port means for causing the inflow port means to communicate with said outflow port means; and

actuating valve means for opening the return port means when a difference in pressure between the inflow and outflow port sides of the throttling path means is higher than a predetermined value, and closing the return port means when the pressure difference is lower than the predetermine value.

4,887,633

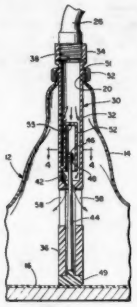
FLUID FILL VALVE FOR FLUID INFLATABLE CHAMBERS AND TOILET TANKS

Lundy S. Taylor, Jr., 6916 Elbrook Rd., Lanham, Md. 20206

Filed Jun. 8, 1989, Ser. No. 363,640

Int. Cl.[4] F16K *15/20*

U.S. Cl. 137—225 **5 Claims**



1. In combination with a chamber for receiving fluid therein and fluid inlet means for said chamber as well as an inlet valve assembly operatively associated with said fluid inlet means for controllably admitting a predetermined quantity of fluid into the said chamber from a source of fluid under pressure, said inlet valve assembly including a elongated tubular body having inlet and outlet ends, said inlet end being fluid-tight sealed relative to said fluid inlet means, an elongated valve member mounted in said elongated tubular body for longitudinal rectilinear shifting relative thereto between first and second limit positions and including first and second ends, said first end projecting outwardly of said outlet end for extension and retraction relative thereto responsive to back and forth shifting of said valve member between said first and second limit positions, said second end of said valve member having an enlarged valve head thereon, said tubular body including an annular valve seat through which said valve member extends, said valve head being seatingly engagable with said valve seat upon shifting of said valve member in said tubular body away from said inlet end to said first limit position with said first end portion projecting a maximum predetermined distance outwardly of said outlet end, said chamber and valve member including co-acting means of operative, responsive to said predetermined quantity of fluid being received in said chamber, to cause said valve member to be shifted to said first limit position and terminate the flow of fluid into said chamber

said tubular body being disposed upright and said inlet and outlet ends are disposed uppermost and lowermost respectively, said chamber comprising a fluid inflatable flexible bladder including upper and lower bladder panels, said third inlet means being formed in said upper panel.

4,887,634

APPARATUS FOR COUPLING A VALVE AND ROTARY ACTUATOR

Henry R. Killian, Monroe, N.C., assignor to Conbraco Industries, Inc., Matthews, N.C.

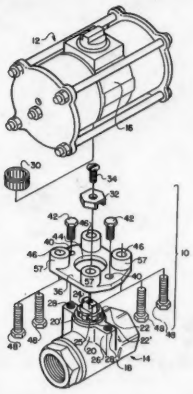
Filed May 5, 1989, Ser. No. 347,914

Int. Cl.[4] F16K *43/00, 31/124*

U.S. Cl. 137—315 **5 Claims**

5. Apparatus for coupling a ball valve of the type having a valve body which rotatably supports a valve ball for reciprocal opening and closing rotation and gland means which rotatably supports a valve stem in operative connection to said valve ball for actuating movement thereof, said gland means including a drive portion having an annular drive surface disposed exteriorly of said valve body for actuating tightening movement of

said gland means with respect to said valve body, and a rotary actuator of the type having an actuator body rotatably supporting an output shaft for reciprocal driving rotation, said coupling apparatus comprising drive means for establishing positive coaxial drive connection of said valve stem and said output shaft for controlling opening and closing movement of said valve ball, said drive means including nut means affixed coaxially about said valve stem and mating drive socket means affixed to said output shaft for coaxially receiving said nut means in annular driving engagement therewith, and bracket means for substantially rigidly connecting said valve body and said actuator body, said bracket means including plate means having a flat main body bolted to said valve body axially



adjacent one side of said drive surface of said gland means and defining an axial opening receiving and closely conforming to said valve body annularly with respect to said gland means for applying to said valve body reactive loads generated by valve actuation forces of said rotary actuator, whereby essentially only torsional actuation forces are applied to said valve stem, and said plate means further including a plurality of spacer members projecting from said flat main body and bolted to said actuator body for supporting said actuator body axially adjacent the opposite side of said drive surface of said gland means, said plate means exposing said drive surface of said gland means for access thereto for periodic tightening without disassembly of said bracket means.

4,887,635

FLUID FILL VALVE WITH ACCURATE FILL LEVEL MECHANISM

Dwight N. Johnson, Carlsbad, Calif., assignor to Masco Corporation of Indiana, Taylor, Mich.

Filed Apr. 3, 1989, Ser. No. 332,071
Int. Cl.[4] F16K *21/20, 31/34*
U.S. Cl. 137—393 **17 Claims**

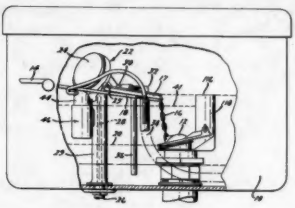
1. A fill valve for a tank characterized by:

a housing containing a main valve means operably connectable to a liquid inlet conduit for opening and closing with respect to said inlet conduit;

means for controlling said main valve means in response to a response level of liquid in a control chamber that corresponds to an actuation pressure level in said tank;

said control chamber within said housing having an inlet in open communication with said tank;

said inlet being positioned above the bottom of said control chamber and said actuation pressure level in said tank such that when the liquid level in the tank rises to the inlet above said actuation pressure level to a fill level at which time liquid overflows into said inlet and passes downward to said control chamber and fills said control chamber at least to said response level wherein the means for controlling the main valve means closes said main valve; and



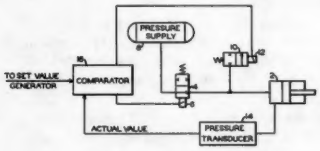
drain means for draining liquid from said control chamber to reset said means for controlling said main valve means when the liquid level drops below said fill level.

4,887,636

APPARATUS FOR THE CONTINUOUS CONTROL OF SOLENOID VALVES WHICH ARE NORMALLY DESIGNED FOR INTERMITTENT OPERATION

Johann Rothen, Sarstedt, Fed. Rep. of Germany, assignor to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Jan. 24, 1986, Ser. No. 822,355
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1985, 3502276
Int. Cl.[4] G05D *16/00*
U.S. Cl. 137—487.5 **5 Claims**



1. Apparatus for the continuous control of an electrically-actuated solenoid valve for controlling a pressure which is normally designed for intermittent operation comprising, a pressure transducer for generating an actual value signal which is proportional to the pressure to be controlled, a pressure set value adjuster for generating a set value signal, a comparator device for the generation of pulse-type control signals with variable pulse width repetition rate within a given pressure range for controlling the solenoid valve in accordance with the difference between the actual value signal and the set value signal, and said comparator device generating control pulses for controlling the solenoid valve within a predetermined initial pressure range in accordance with the actual value pressure signal produced by the pressure transducer in such a way that the solenoid valve is slightly opened by being pulsed from a closed valve position, wherein the pulse width t_p of the control pulses can be changed in accordance with the measured pressure changes Δp so that the measured pressure change is compared to lower and upper values for the differential pressure changes $\Delta p1$, $\Delta p2$ and so that the pulse width is changed by a certain value of time Δt when the lower or upper value is exceeded.

4,887,637

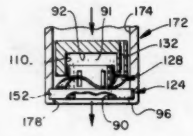
PRESSURE COMPENSATING FLOW CONTROL DEVICE

Eugene N. Ketner, Box 836, Graham, Tex. 76046

Division of Ser. No. 525,564, Aug. 22, 1983, abandoned, and Ser. No. 722,867, May 23, 1985, abandoned. This application Oct. 6, 1987, Ser. No. 255,805

Int. Cl.[4] G05D *7/01*; F16K *17/24*

U.S. Cl. 137—504 6 Claims



1. A flow control device having an inlet end which can be connected to a source of fluid flow and an outlet end through which a controlled flow of fluid is discharged;

a retainer housing having an upper body portion from which a skirt extends in a downstream direction, means forming a working cavity within said skirt;

a spool having a cylindrical extension which is reciprocatingly received within said working cavity; means forming a flow passageway which extends from said inlet end, through said retainer housing through said cylindrical extension, and to said outlet;

a flat annular wave spring means mounted in interposed relationship between said retainer housing and said spool;

said spring means, retainer housing, and spool being arranged whereby increased upstream pressure moves said spool and retainer housing skirt towards one another, thereby compressing said spring means and storing energy therein while reducing the area of said flow passageway, while decreased upstream pressure causes the spring means to urge the housing skirt in a direction away from the spool to thereby reduce the friction to flow through the flow control device;

said flow passageway through said cylindrical extension is a lateral flow port formed through the sidewall thereof so that said skirt member slidably covers said lateral port as said retainer housing compresses said annular spring means;

said flow passageway through said retainer housing includes a longitudinal flow port formed through said skirt, said longitudinal flow port terminates adjacent to said annular spring means.

4,887,638

REGULATOR

Ivan Hellquist, Sollentuna, and Pierre Bühlmann, Lidingö, both of Sweden, assignors to Interspiro AB, Lidingo, Sweden

Filed Aug. 11, 1988, Ser. No. 241,108

Claims priority, application Sweden, Aug. 11, 1987, 8703117

Int. Cl.[4] G05D *16/06*

U.S. Cl. 137—505.13 29 Claims

1. A pressure regulator comprising:

a casing, a first chamber and a second chamber defined in said casing and separated by a first regulating piston movable during the pressure-regulating operation for varying the size of said chambers and a permanently open channel in said piston providing a fluid communication between said first and second chambers;

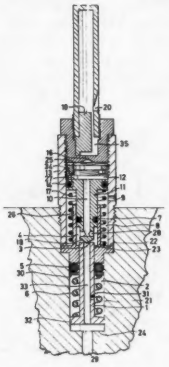
a high-pressure chamber disposed beneath the bottom of said second chamber and connectable to a gas container;

a first aperture extending in the bottom of said second chamber;

a high-pressure piston disposed in said high-pressure chamber and having one end projecting into said second chamber through said first aperture and being displaceable in its longitudinal direction through said first aperture;

a second aperture provided in said projecting end of said high-pressure piston;

a throttle device located between said high-pressure chamber and said second chamber and including means provided in said second aperture and cooperating with said first regulating piston at a first end facing said second aperture;



a fluid connection in said high-pressure piston between said second aperture and the outside of said high-pressure piston in said high-pressure chamber;

a first spring member, which urges said high-pressure piston towards the bottom of said high-pressure chamber;

a second spring member which urges said first regulating piston in the direction away from said means in said second aperture; and

means for deactivation of said regulator provided in the upper wall of said first chamber cooperating with a second end of said first regulating piston.

4,887,639

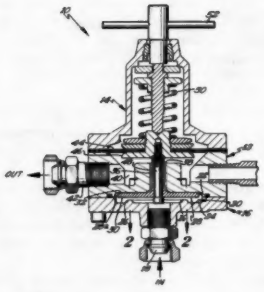
NON-DEGRADING PRESSURE REGULATOR

Richard D. Lewis, Bloomington; James P. Korzenowski, Minneapolis, and Larry J. DeHemmer, Plymouth, all of Minn., assignors to Graco Inc., Minneapolis, Minn.

Filed Jul. 18, 1988, Ser. No. 221,024

Int. Cl.[4] G05D *16/08*

U.S. Cl. 137—505.41 5 Claims



1. A fluid pressure regulator comprising:

a housing having at least one pressure reducing passage along a central axis;

an outlet;

a pressure reducing chamber having a top, a bottom, and a smooth rounded transition between said inside diameter and said top;

disk-like pressure reducing member in said chamber having a thickness, a radius large relative to said thickness, an outer edge, a generally smooth lower surface, a generally smooth upper surface, a stem and a smooth rounded transition between said stem and said upper surface, said stem extending from said upper surface through each said passage, the annular clearance between the inside diameter of each said passage and the outside diameter of said stem and the axial clearance between said top and said upper surface and between said bottom and said lower surface being relatively small compared to said radius and such so as to maintain fluid flow therebetween in the laminar regime; and

an inlet, said inlet being located in said chamber bottom adjacent said axis so as to define a flow path through said inlet, outwardly over said bottom surface, around said outer edge, over said top surface and through said axial pressure reducing passage, said flow path being generally unobstructed, the dimensions of said flow path being such so as to maintain flow in the laminar regime at all times.

4,887,640

FLUID INJECTION SYSTEM

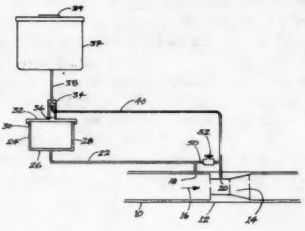
Raymond L. Down, Doubleview, Australia, assignor to Fluid Technology (Aust) Limited, Perth, Australia

Filed Apr. 17, 1987, Ser. No. 40,366

Claims priority, application Australia, Apr. 18, 1986, PH5527

Int. Cl.[4] E03B 7/07

U.S. Cl. 137—564.5 **10 Claims**



1. A fluid injection system comprising: a tubular member arranged to form part of a fluid line through which, in use, fluid flows under pressure; a venturi contained within the tubular member defining high and low pressure sides thereof; a first chamber defining a first volume and arranged to contain a first fluid; a second chamber disposed substantially within the first chamber defining a second volume and arranged to contain a second fluid; pressure responsive means for separating said first and second volumes, said tubular member on said high pressure side of said venturi being in fluid communication by means of a conduit with said first chamber defining said first volume; a metering line extending from said tubular member on said low pressure side of said venturi and being in fluid communication with said second chamber defining said second volume, a pressure differential being created across said venturi for increasing the first volume by fluid passing from said fluid line into the first volume and by movement of said pressure responsive means said pressure responsive means including a flexible non-degradable bladder, the second volume being correspondingly decreased by fluid passing therefrom through said conduit into the fluid flowing through said fluid line; and a bypass conduit containing valve means provided between the high pressure side of the venturi and said fluid line on said low pressure side of said venturi so as to provide an alternate flow of fluid in said fluid line and modify through volumetric displacement the rate of flow of the second fluid.

4,887,641

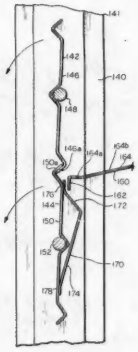
MODIFIED PARALLEL BLADE DAMPER FOR AN AIR HANDLING SYSTEM

Raymond L. Alley, Toledo, Ohio, assignor to Mestek, Inc., Westfield, Mass.

Filed Dec. 12, 1988, Ser. No. 282,565

Int. Cl.[4] F16K 11/02

U.S. Cl. 137—601 **20 Claims**



1. A damper for an air handling system comprising:

an annular frame surrounding and helping to define an air flow path;

a first blade assembly having a first rod extending across said annular frame within said air flow path and being within said air flow path, said first rod being oscillatable about its longitudinal central axis, said first blade assembly further having a first blade with an edge, said first blade being attached to said first rod and being oscillatable therewith between a first position of said first blade in which said first blade extends generally parallel to said air flow path and a second position of said first blade in which said first blade extends generally normally of said air flow path;

a second blade assembly having a second rod, said second rod being spaced from said first rod and extending generally parallel to said first rod across said air flow path and being within said air flow path, said second rod being oscillatable about its longitudinal central axis, said second blade assembly further having a second blade with an edge, said second blade being attached to said second rod and being oscillatable therewith between a first position of said second blade in which said second blade extends generally parallel to said air flow path and a second position of said second blade in which said second blade extends generally normally of said air flow path, said edge of said second blade being adapted to touch said edge of said first blade when said second blade is in said second position of said second blade and said first blade is in said second position of said first blade;

means for oscillating said first rod and said second rod such that said first blade is in said first position of said first blade when said second blade is in said first position of said second blade and said first blade is in said second position of said first blade when said second blade in is said second position of said second blade; and

fixed baffle means extending across said annular frame within said air flow path, said fixed baffle means being positioned between said first blade assembly and said second blade assembly and extending generally parallel to said first rod and said second rod, said fixed baffle

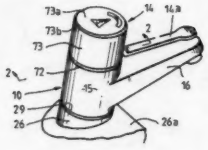
means serving as a resistance to flow with respect to air flowing between said first blade assembly and said second blade assembly.

4,887,642

SINGLE HANDLE MIXING TAP OR VALVE

Georg J. Bernat, Victoria, Australia, assignor to Dorf Industries Pty. Ltd., Victoria, Australia

Filed Oct. 26, 1988, Ser. No. 262,807
Claims priority, application Australia, Oct. 27, 1987, PI5086
Int. Cl.[4] F16K *11/06*
U.S. Cl. 137—625.41 15 Claims



1. A single handle mixing tap having a longitudial axis, said tap comprising:

a tap body;

a rotatable and pivotable handle; and

a valve mechanism in the tap body, said valve mechanism comprising;

a pair of discs each having at least one aperture, a movable one of the pair of discs being rotatable and transversely movable relative to a fixed one of the pair of discs whereby fluids to be mixed from two separate inlets to the tap in communication with the apertures can be mixed when said apertures are at least partially aligned, each of said at least one aperture being partially to substantially aligned to thereby very a ratio of volumes of each of the fluids as well as a combined volume of the fluids, and

a ball joint arrangement coupled to the handle through a lever, said lever being rotatable and pivotable with rotation and pivoting of said handle, said ball joint arrangement comprises a ball received within a complementary socket in the lever, said ball having at least one pin engaging a slot within said socket, said at least one pin extending transversely of the longitudinal axis of the tap, rotation and pivoting of the handle being transferred to the movable disc through said lever, said handle and lever being rotatable about an axis of said ball joint to transversely move said movable disc, the axis for rotation and axis for pivoting being positioned such that substantially all forces applied by the handle to the ball joint are radially of said joint rather than along the longitudinal axis of the tap.

4,887,643

PILOT ACTUATED SPOOL VALVE

Jerry B. Tomlin, Sugar Land, and Ingo W. V. Olejak, Houston, both of Tex., assignors to Koomey, Inc., Houston, Tex.

Filed Mar. 1, 1982, Ser. No. 353,272
Int. Cl.[4] F15B *13/042*
U.S. Cl. 137—625.66 4 Claims

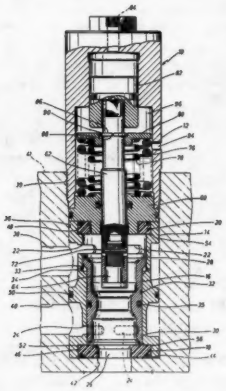
3. In a pilot controlled valve having a housing and a generally tubular shaped cage having supply fluid ports, vent ports, and an outlet port, a pilot actuated hollow spool valve element telescopically movable in the cage, poppet valve seats at opposite ends of the cage for engagement by the valve element, the improvement comprising,

said fluid ports and vent ports being elongated slots directed transversely to the axis of the cage and valve element for providing maximum flow passages with a minimum of spool travel,

the outer circumference of the terminal ends of the spool being in at least partial contact with the cage at all times, and the axial extent of contact between the spool and the cage being greater than fifty percent at all positions,

said spool engaging the interior of the cage at the location of the supply fluid ports and vent ports for reducing flow restrictions,

said cage being metal and including a recess coaxially positioned at each end of the cage for entirely receiving one of the valve seats whereby the seats are enclosed about their sides and are protected by the cage from being axially overloaded, and



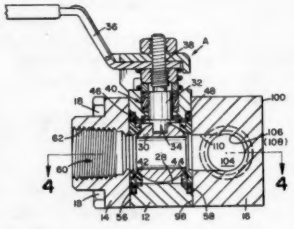
a metal valve housing abutting one end of the metal cage and including exterior threads for securing the valve into a valve receiving pocket whereby threadedly securing said valve into the receiving pocket with the other end of the metal cage engaging said pocket will provide a metal contact of said valve with the pocket to avoid loading of soda valve seats.

4,887,644

TEE FITTING INTEGRALLY FORMED IN VALVE BODY

Jeffrey T. Jeromson, Willoughby, and Peter C. Williams, Cleveland Heights, both of Ohio, assignors to Whitey Co., Highland Heights, Ohio

Filed May 24, 1988, Ser. No. 197,839
Int. Cl.[4] F16K *5/00*
U.S. Cl. 137—876 21 Claims



1. A valve comprising:

a body having a central body portion and first and second

end members disposed on opposite ends of said central body portion;

means for securing said first and second end members to said central body portion;

a chamber defined in said body;

a valve member received in said chamber for selective movement between open and closed positions;

said first end member abuttingly engaging said central body portion, said first end member including a first passage therein communicating with said chamber and a second passage disposed generally perpendicular to and communicating with said first passage, said second passage adapted for communication with an associated fluid line; and,

said second end member including a third passage therein communicating with said chamber.

4,887,645

CONTROL STATION FOR PRESSURIZED GASES

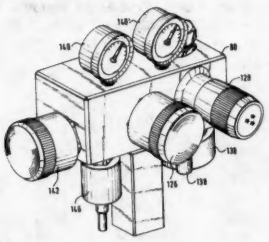
Leon Kerger, Helmdange, Luxembourg, assignor to Ceodeux S.A., Lintgen, Luxembourg

Continuation of Ser. No. 166,131, Mar. 9, 1988, abandoned. This application May 30, 1989, Ser. No. 361,793

Claims priority, application Luxembourg, Mar. 9, 1987, 86802

Int. Cl.[4] F16K *11/00*

U.S. Cl. 137—884 **1 Claim**



1. A gas flow system having a working circuit, having a reservoir of compressed or liquefied gas, having a reservoir of scavenging gas, having a first group of accessories for control, regulation and monitoring of said compressed or liquefied gas, having a second group of accessories for control, regulation and monitoring of said scavenging gas, and having a control station for mounting said accessories, said system being characterized in that said control station comprises a first compact unit block having a single inlet connected to said reservoir of compressed or liquefied gas and having a single outlet connected to said working circuit, said first group of accessories comprising a first pressure reducing valve for controlling the pressure of the compressed or liquefied gas flowing out of the first block, said first block comprising, on its surface, standard connections in which all of said accessories of said first group are screwed or welded sealingly, conduits formed through said first block by machining and connecting the accessories of said first group to one another in a logical and appropriate way to allow the selective flow of compressed or liquefied gas through said first block from the inlet of the first block to the outlet thereof while enabling said first pressure reducing valve to control the pressure of the compressed or liquefied gas flowing out of the outlet of the first block, said station further comprising a second and separate compact unit block having a single inlet connected to said reservoir of scavenging gas and having a single outlet connected to said first block, said second group of accessories comprising a second pressure reducing valve for controlling the pressure of the scavenging gas flowing out of the outlet of said second block and flowing to said first block, said second block comprising, on its surface, standard connections in which all of said accessories of said second group are screwed or welded sealingly, and conduits formed through said second block by machining and connecting the accessories of said second block to one another in a logical and appropriate way to allow the selective flow of scavenging gas through said second block from the inlet of the second block to the outlet thereof while enabling said second pressure reducing valve to control the pressure of the scavenging gas flowing out of the outlet of said second block and flowing to said first block.

4,887,646

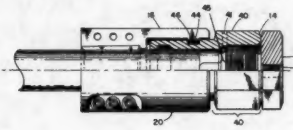
TEST FITTING

Oliver J. Groves, County of King, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 18, 1988, Ser. No. 157,901

Int. Cl.[4] F16L *55/10*; G01M *3/28*

U.S. Cl. 138—90 **10 Claims**



1. A test fitting for an annular tubing comprising: means for subjecting the tubing to a fluid pressure, an annular sleeve having an interior surface and an exterior surface, said interior surface having a diameter slightly larger than an external diameter of said tubing, said sleeve having an interior annular recess in said interior surface having an O ring and backup rings therein for contacting said tubing to provide a fluid seal between said tubing and said sleeve, said sleeve having an exterior annular recess in said exterior surface;

a collar assembly including two collar members being held together by fasteners, said collar assembly having a restraining portion and a gripping portion, said restraining portion enclosing a portion of said sleeve and having flanges extending into said exterior annular recess in said sleeve for holding said sleeve onto said tubing, said gripping portion including a tapered interior surface region;

two tapered sleeves being tapered at an exterior surface and of uniform curvature at an interior surface having the exterior surface in mating contact with said gripping portion of said collar assembly and said interior surface being in contact with said tubing such that shear force between said tapered sleeves and said tube is transferred, at least partially, into inward compression force on said tapered sleeves.

4,887,647

HOSE

Ichiro Igarashi; Hiroaki Ito, and Kazuhiko Nishimura, all of Aichi, Japan, assignors to Tokai Rubber Industries, Ltd., Komaki, Japan

Filed Jun. 15, 1988, Ser. No. 206,792

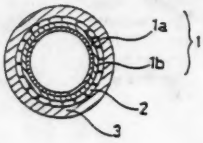
Claims priority, application Japan, Jul. 8, 1987, 62-171670

Int. Cl.[4] F16L *11/04*

U.S. Cl. 138—126 **5 Claims**

1. A hose comprising an inner rubber tube, said inner rubber tube comprising an innermost rubber layer, wherein said innermost rubber layer is made from a fluororubber composition consisting essentially of a fluororubber and a compound capable of causing crosslinking of the fluororubber in the presence of a peroxide, wherein said fluororubber is a copolymer of three comonomers which are tetrafluorethylene, vinylidene fluoride and hexafluoropropylene, wherein the amount of vinylidene fluoride in said fluororubber is in the range of 10–50

mole % based on the total amount of said comonomers, and the amount of said compound capable of causing crosslinking of



the fluororubber is not more than 2.0 parts by weight per 100 parts by weight of the total amount of said comonomers.

4,887,648

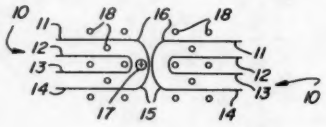
METHOD FOR MAKING A MULTI-LAYERED PAPERMAKERS FABRIC WITH SEAM

Francis J. Cunnane, Greer, S.C., assignor to Asten Group, Inc., Charleston, S.C.

Division of Ser. No. 212,035, Jun. 23, 1988, which is a continuation of Ser. No. 66,139, Jun. 24, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 335,595

Int. Cl.[4] D03D *23/00*

U.S. Cl. 139—383 H 8 Claims



1. A method of producing and seaming a multi-layer, woven papermakers fabric, comprising:

(a) providing a plurality of cross machine direction yarns in at least four layers;

(b) providing a plurality of machine direction yarns for interweaving with said cross machine direction yarns;

(c) interweaving the machine and cross machine direction yarns, each of said machine direction yarns interwoven with two cross machine direction yarn layers in succession so that the interweaving of each of said machine direction yarns results in two machine direction yarns layers and a plurality of fabric end loops;

(d) positioning the loops of the first end of said fabric adjacent to and opposite the loops of the second end of said fabric to define a seaming channel; and

(e) closing said channel.

4,887,649

WEFT BOBBIN CHANGER FOR A LOOM

Hubert P. van Mullekom, Deurne, Netherlands, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jun. 2, 1988, Ser. No. 201,688

Claims priority, application Switzerland, Jun. 25, 1987, 390/87

Int. Cl.[4] D03D *47/34*; B65H *67/02, 69/02*

U.S. Cl. 139—450 21 Claims

1. A weft bobbin changer for a loom comprising

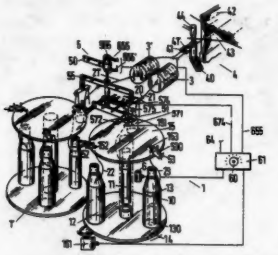
a delivery bobbin for supplying a weft yarn;

at least one reserve bobbin containing a weft yarn;

a sensor responsive to the quantity of weft yarn on said delivery bobbin;

control means connected to said sensor, said control means being responsive to a signal from said sensor corresponding to an adjustable minimum quantity of yarn on said delivery bobbin to emit a stop signal to stop the loom;

piecing-up means responsive to said control means for piecing-up a yarn from said reserve bobbin with a yarn from said delivery bobbin in response to said adjustable minimum quantity of weft yarn being reached on said delivery bobbin; and



a yarn severing device for severing the weft yarn from said delivery bobbin downstream of a point of connection with the weft yarn from said reserve bobbin.

4,887,650

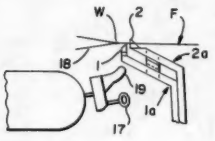
BEAT-UP MECHANISM FOR WEAVING LOOMS

Thomas F. McGinley, 903 N. 32nd St., Allentown, Pa. 18104

Filed Oct. 27, 1988, Ser. No. 263,269

Int. Cl.[4] D03D *41/00*

U.S. Cl. 139—460 19 Claims



1. A beat-up mechanism for a weaving machine comprising:

an indexing reed having a series of warp thread engaging index fingers arranged in parallel across its width, said index fingers each including a root section and a tip section, said root section having a transverse wider width that the tip section;

a beat-up reed having a series of warp thread engaging beat-up fingers arranged in parallel across its width, said beat-up fingers each including a root section and a tip section, said root section having a transverse wider width than the tip section;

said beat-up reed arranged to cooperate with and move relative to said indexing reed so as to maintain a consistent spacing between warp threads being woven in the weaving machine while beating up weft threads into the fell of the cloth produced by the machine.

4,887,651

METHOD FOR PRESSURIZING LIQUID

Moises Santiago, Cooper City, Fla., assignor to Union Carbide Corporation, Danbury, Conn.

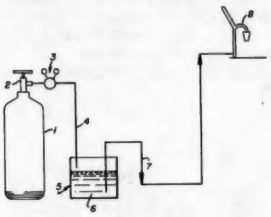
Division of Ser. No. 49,555, May 14, 1987, abandoned. This application Oct. 17, 1988, Ser. No. 258,703

Int. Cl.[4] B67C *1/04*

U.S. Cl. 141—1 13 Claims

1. A method for pressurizing an aqueous liquid in a container and delivering the liquid from the container into a vessel while controlling the foaming effect of the liquid comprising contacting the liquid in the container with a gas mixture which is at a

pressure exceeding that of the liquid, said gas mixture consisting essentially of from 32 to 70 volume percent carbon dioxide and the balance being one or more gases having a solubility in



water less than carbon dioxide, and passing the liquid from the container into a vessel while reducing the pressure of the liquid and generating foam in a controlled manner.

4,887,652

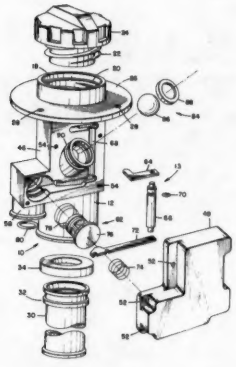
SYSTEM FOR CONTROLLING THE RELEASE OF FUEL VAPORS FROM A VEHICLE FUEL TANK

George H. Bucci, Tolland, Conn., assignor to Whitehead Engineered Products, Inc., Meriden, Conn.

Filed Mar. 26, 1987, Ser. No. 31,030

Int. Cl.[4] B65B *3/18*

U.S. Cl. 141—59 **37 Claims**



1. A fuel filler pipe assembly for attachment to a fuel tank comprising:

(a) a cap which includes a male screw thread;

(b) an outer tube for attachment to the fuel tank having a mouth for receiving fuel and means for attaching the cap to the tube to seal closed the mouth comprising a female screw thread formed in the mouth which is complementary to the male screw thread on the cap;

(c) a partition located within the outer tube which divides the interior of the tube into a first conduit extending from the mouth towards the fuel tank for carrying fuel from the mouth to the fuel tank and a second conduit, isolated from the mouth and extending away from the fuel tank, for carrying fuel vapors out of the fuel tank;

(d) a third conduit for connecting the second conduit to a vapor capture device; and

(e) valve means for opening and closing the third conduit, said means being operated by the attachment and detachment of the cap to the outer tube such that attachment moves the cap into contact with the valve means to close the valve means so as to seal the fuel tank and detachment moves the cap out of contact with the valve means to open the valve means so that fuel vapors are routed from the fuel tank to the vapor capture device, said valve means including a normally-closed valve and spring-loaded means which contacts the valve and moves the valve into its open position, the attachment of the cap to the outer tube moving the cap into contact with the spring-loaded means so as to move the spring-loaded means away from the valve so that the valve moves into its closed position.

4,887,653

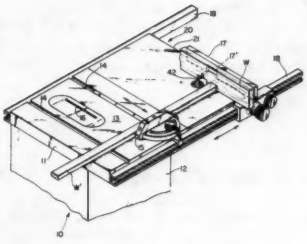
POWER TOOL ATTACHMENT FOR TABLE SAWS

Alvin R. Thomas, Rte. 1, Box 360, Troutville, Va. 24175

Filed Nov. 4, 1988, Ser. No. 267,259

Int. Cl.[4] B27C *9/02*; B27H *1/00*

U.S. Cl. 144—286 R **9 Claims**



1. In combination with a table saw comprising a table with a first work surface defining a first work area and an edge, a support for said table, a plurality of linear elements projecting from said edge, and a saw carried by said table having a cutting blade adjustable between an operative position above said table and an inoperative position beneath said table, a removable power tool attachment comprising:

a platform having a second work surface defining a second work area,

means on said platform for removably connecting said platform to said linear elements projecting from said edge of said table,

means on said platform for attaching a power tool thereto, and

a power tool on said platform supported by said attaching means,

whereby a workman may use said power tool attachment only to enlarge said first work area by said second work area to accommodate large workpieces, or may use said saw and said power tool in sequence or simultaneously without having to remove and replace said saw or said power tool.

4,887,654

FLOATING DOCK

David H. Rytand, 2402 Killarney Way, S.E., Bellevue, Wash. 98004

Continuation-in-part of Ser. No. 816,204, Jan. 6, 1986, Pat. No. 4,709,647. This application Oct. 8, 1987, Ser. No. 106,150

Claims priority, application New Zealand, Oct. 15, 1986, 217943

Int. Cl.[4] B63B *35/38*

U.S. Cl. 114—267 **28 Claims**

1. A floating dock, comprising:

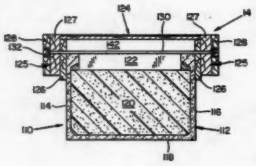
a plurality of aligned float modules having aligned opposing walls;

a deck having opposing edges the deck being in spaced relationship above said float modules;

a pair of wale means extending along and in engagement

with each of said opposing walls of said float modules and said opposing edges of said deck;

a compression member extending between said opposing walls of each float module; and



compression means extending between and acting on said pair of wale means such that said compression means exerts compression force on said float modules, compression member and deck whereby said float modules, deck, compression member and wale may form a box beam type structure.

4,887,655

HEAVY DUTY-HIGH PRESSURE PNEUMATIC RADIAL TIRES

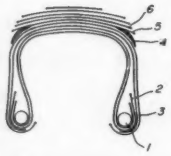
Isamu Imai, Tokorozawa, and Norio Inada, Kodaira both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed May 6, 1987, Ser. No. 46,363

Claims priority, application Japan, Jun. 20, 1986, 61-142968

Int. Cl.[4] B60C *9/20*

U.S. Cl. 152—531 **12 Claims**



1. A heavy duty - high pressure pneumatic radial tire comprising; a main reinforcement consisting of a carcass having an up-and-down type toroid radial construction in which a plurality of plies composed of fiber cords arranged in parallel with one another are turned up around a pair of bead cores on the right and left of the tire while the cords are arranged at angles substantially along radial planes of the tire, at least one ply including a ply to be brought into direct contact with the bead cores being turned up around each of the bead cores from the inside to the outside of the tire and a least one remaining ply being laminated upon the outer side of the turn-up portion formed by the turn-up end portion of said at least one ply, and a belt which surrounds a crown portion of the carcass and composed of a plurality of layers of parallel organic fiber cords having an initial modulus of at least 150 g/d which is higher than that of the cords of the carcass while at least one belt layer is laminated at a cord-arranged angle near substantially 0° with respect to the crown circumference, said belt including a layer composed of cords having a larger twisting shrinkage at the widthwise opposite shoulder regions than at the central portion, the plies of the carcass being composed of organic fiber cords having a thermal shrinkage of not less than 1.0 and not more than 10% at 177° C.; and the bead cores are braided bead cores of a substantially circular section formed of helically stranded steel wires wound around a core wire.

4,887,656

WOVEN FABRIC WITH BIAS WEFT AND TIRE REINFORCED BY SAME

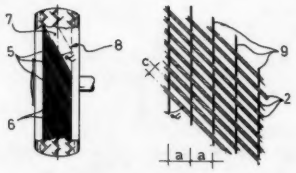
Germain Verbauwhede, Kanaalstraat 84, and Roger Vanassche, Paul Ferrardstraat 8d, both of B- 8550 Zwevegem, Belgium

Filed Jun. 9, 1987, Ser. No. 60,073

Claims priority, application United Kingdom, Jun. 20, 1986, 8615118; Belgium, Jul. 24, 1986, 1/011522

Int. Cl.[4] B60C *09/18*; D03D *47/00*

U.S. Cl. 152—531 **14 Claims**



1. A woven fabric for reinforcing elastomers comprising warp elements with a warp pitch a and unidirectional single stranded threadlike weft elements with a width b, a tensile modulus of at least 180,000 N/mm^2 and a weft pitch c, characterized in that the angle α between warp and weft element is more than 15° and less than 30° whereas the packing factor b/c is between 45% and 80% and whereas $3c \leqq a \leqq 15c$.

4,887,657

SPACER FOR A VERTICAL BLIND

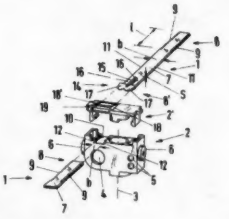
Horst Spohr, Cuxhaven, Fed. Rep. of Germany, assignor to Bautex Adolf Stover Sohne KG, Lang-Sievern, Fed. Rep. of Germany

Filed Apr. 9, 1987, Ser. No. 36,074

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1986, 3611857

Int. Cl.[4] E06B *9/38*

U.S. Cl. 160—178.1 **21 Claims**



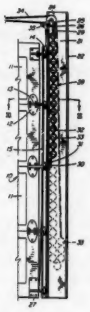
1. An assembly for separating adjacent slats of a vertical blind, which slats are receivable within slat holders which are movable along a track, and which assembly comprises a lengthwise strip-like spacer having at one end a first connection element connected to a second connection element in a first of the slat holders and at the other end a catch for retaining the spacer in a guide on a second of the slat holders, wherein the spacer can be moved longitudinally through the guide on the second of the slat holders, and wherein the first connection element has at least two recesses along the length of the spacer and the second connection element includes a corresponding projection on the first of the slat holders for connecting at least one of the recesses of the spacer to the first of the slat holders at one of at least two longitudinally distinct points.

4,887,658

FLEXIBLE COUNTERWEIGHT SYSTEM FOR OVERHEAD DOORS AND LIKE INSTALLATIONS HAVING REMOVABLE WEIGHTS

Hermel R. Cloutier, 1095 Mississauga Street West, Orillia, Ontario, Canada

Filed Jul. 1, 1988, Ser. No. 214,288
Int. Cl.[4] E05F *11/54*
U.S. Cl. 160—190 **22 Claims**



17. A counterweight assembly for use in a sectional door installation wherein opposite ends of the door are guided in a pair of upright tracks positioned at opposite margins of a doorway, upper portions of said tracks being curved to extend horizontally away from said doorway such that when the door is moved from the closed position to the open position door sections follow in succession along the path of said tracks, said counterweight assembly comprising a flexible elongate carrier having a series of weights spaced at predetermined positions along its length, said weights being spaced from each other sufficiently so as not to prevent flexure of the carrier, the carrier having one end that is to be suspended from an element coupled to the lower part of the door and an opposite end for connection to a fixed attachment point, such that in use when the door is in the closed position, substantially the entire weight of said series of weights is applied and forces urging the door in that opening direction, wherein when the door is moved in the opening directions said one end of the carrier moves downwardly under the force of gravity so that through folding elements of said carrier commencing from said opposite end therein said weights become successfully supported from the fixed attachment point and thus cease to applying any force to the door, said carrier being comprised of at least one flexible member of unitary construction which extends from said element coupled to the lower part of the door to said fixed point of attachment.

4,887,659

HIGH SPEED FOLDING DOOR

Floyd D. West, Galena, Ill., assignor to Frommelt Industries, Inc., Dubuque, Iowa

Filed Jul. 7, 1988, Ser. No. 216,325
Int. Cl.[4] E05D *15/26*
U.S. Cl. 160—199 **22 Claims**

1. A folding door comprising:

first and second side frames disposed adjacent to respective lateral edges of an opening in a wall;

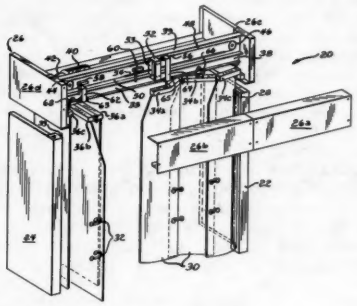
a header assembly disposed adjacent to an upper edge of and extending across the aperture and coupled to respective upper portions of said first and second side frames;

a support structure coupled to an disposed adjacent to said header assembly;

a plurality of trolleys coupled to and suspended from said support structure;

a plurality of support arms each coupled to and suspended from a respective trolley, wherein each of said support arms includes an elongated slot extending the length of said support arm along a lower portion thereof;

a plurality of flexible panels each including a mounting lip having a thickness greater than that of said flexible panel and extending the length of an upper edge thereof, wherein said attachment lip is adapted for sliding insertion in and engagement by the slot of a respective support arm



substantially along the length thereof in coupling and suspending each of said flexible panels from a respective support arm;

flexible coupling means for coupling adjacent panels to one another; and

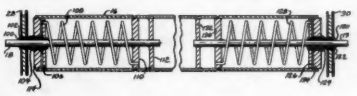
drive means coupled to said trolleys for linearly displacing said trolleys along said support structure in opening and closing said folding door.

4,887,660

ROLL-UP DOOR

Thomas J. Kraus, Sherrill, Iowa, assignor to Frommelt Industries, Inc., Dubuque, Iowa

Filed Jun. 30, 1988, Ser. No. 213,696
Int. Cl.[4] A47G *5/02*
U.S. Cl. 160—265 **12 Claims**



1. A roll-up door disposed across an aperture in a wall, said door comprising:

a cylindrical tube disposed adjacent to an upper portion of the aperture;

a flexible curtain coupled to and wound around said tube in a first direction of winding;

a first support shaft coupled to a first end of said tube and a second drive shaft coupled to a second end of said tube, said drive shaft further coupled to drive means for rotationally displacing said tube;

first and second pulleys respectively mounted to said first support shaft and said second drive shaft;

first and second belt means respectively coupled to and wound around said first and second pulleys in a second, opposed direction of winding for coupling said pulleys to a free end of said curtain;

biasing means including first and second coiled torsion springs respectively disposed about and along the lengths of said first support shaft and said second drive shaft, wherein each of said coiled torsion springs is coupled at their respective ends to said tube and to one of said pulleys for rotationally urging said tube in said first direction of

winding for rolling up said curtain on said tube and for rotationally urging said pulleys in said second, opposed direction of winding for rolling up said belt means on said pulleys so as to maintain said curtain in a tightly stretched condition;

first and second inner hubs and third and fourth outer hubs, wherein each of said first and second inner hubs is coupled to a first inner end of a respective torsion spring and each of said third and fourth outer hubs is coupled to a second outer end of a respective torsion spring;

fifth and sixth end hubs disposed on respective ends of said tube and through which said first support and said second drive shafts extend; and

first and second bearing means disposed respectively between said first end hub and said first support shaft and between said second end hub and said second drive shaft for facilitating rotational displacement between said tube and said pulleys;

wherein changes in the length of curtain unwound from said tube are compensated for by corresponding changes in a roll-up torque exerted on the belt means by the pulleys and biasing means so as to counterbalance the weight of curtain removed from said tube and maintain the curtain in equilibrium as it is unwound from and wound onto said tube.

4,887,661

CASTING MOLD FOR FOUNDRY CASTINGS

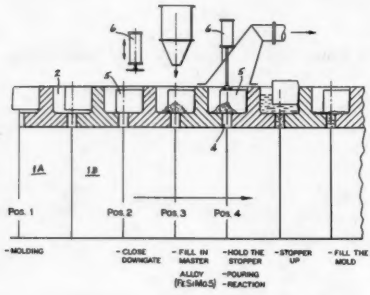
Wilhelm Hauke, Hilzingen, Fed. Rep. of Germany, assignor to Georg Fischer AG, Schaffhausen, Switzerland

Filed Feb. 6, 1989, Ser. No. 307,674

Claims priority, application Switzerland, Feb. 5, 1988, 423/88

Int. Cl.[4] B22D *27/00*

U.S. Cl. 164—55.1 **8 Claims**



8. A process for the production of castings in a casting mold having a melt treatment chamber located above a mold cavity and in communication therewith via an entry duct for passing the melt from the treatment chamber to the melt cavity, the improvement comprising the steps of:

providing a duct closing element in said treatment chamber above said entry duct and forming said closing element as a piece of said casting mold;

applying a force to said closing element for shearing said closing element from said casting mold and biasing said closing element against said entry duct for sealing same;

positioning a treatment agent in said treatment chamber;

pouring said melt into said treatment chamber while maintaining said closing element in sealing engagement with said entry duct; and

thereafter removing said force from said closing element whereby said closing element floats upward in said melt thereby unsealing said entry duct so as to allow said melt to flow from said treatment chamber through said duct and into said mold cavity.

4,887,662

COOLING DRUM FOR CONTINUOUS-CASTING MACHINES FOR MANUFACTURING THIN METALLIC STRIP

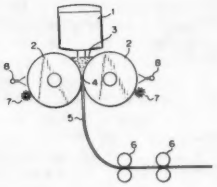
Shigenori Tanaka, c/o R & D Laboratories-III, Nippon Steel Corporation, 1-1-1, Edamitsu, Yahatahigashi-ku, Kitakyusyu-shi, Fukuoka; Yasuo Itoh, Plant Engineering Technology Bureau, Nippon Steel Corporation, 1-1-1, Edamitsu, Yahatahigashi-ku, Kitakyusyu-shi, Fukuoka; Michiya Hayashida, c/o Sakai Works, Nippon Steel Corporation, 1, Yawatacho, Chikko, Sakai-shi, Osaka; Kenichi Hara, c/o Nagoya Works, Nippon Steel Corporation, 5-3, Tokai-cho, Tokai-shi, Aichi; Keiichi Yamamoto, c/o Hiroshima Technical Institute, Mitsubishi Jukogyo Kabushiki Kaisha, 6-22, Kan-on-shinmachi 4-chome, Nishi-ku, Hiroshima-shi, Hiroshima; Hikotaro Itani, c/o Hiroshima Technical Institute, Mitsubishi Jukogyo Kabushiki Kaisha, 6-22, Kan-on-shinmachi 4-chome, Nishi-ku, Hiroshima-shi, Hiroshima; Atsumu Yamane, c/o Mitsubishi Jukogyo Kabushiki Kaisha, 2-5-1, Marunouchi, Chiyoda-ku, Tokyo; Akio Kasama, c/o R & D Laboratories-III, Nippon Steel Corporation, 1-1-1, Edamitsu, Yahatahigashi-ku, Kitakyusyu-shi, Fukuoka; Isao Suichi, c/o R & D Laboratories-III, Nippon Steel Corporation, 1-1-1, Edamitsu, Yahatahigashi-ku, Kitakyusyu-shi, Fukuoka; Hiroyuki Kajioka, c/o R & D Laboratories-III, Nippon Steel Corporation, 1-1-1, Edamitsu, Yahatahigashi-ku, Kitakyusyu-shi, Fukuoka, and Kunimasa Sasaki, c/o Hiroshima Machinery Works, Mitsubishi Jukogyo Kabushiki Kaisha, 6-22, Kan-on-shinmachi 4-chome, Nishi-ku, Hiroshima-shi, Hiroshima, all of Japan

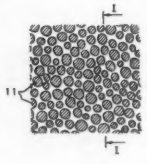
Filed Sep. 22, 1988, Ser. No. 247,691

Claims priority, application Japan, Sep. 24, 1987, 62-240479; Aug. 15, 1988, 63-202962; Aug. 15, 1988, 63-202963

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—427 **6 Claims**





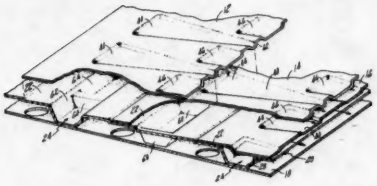
1. A cooling drum for continuous-casting machines for manufacturing thin metallic strips, and having a surface composing part of a casting mold wall in contact with molten metal, wherein said surface has numerous dimples disposed uniformly thereon and not in contact with each other, and each of said dimples has an opening portion in the form of a circle or an oval with a diameter of from 0.1 to 1.2 mm and a depth of from 5 to 100 μm.

4,887,663

HOT GAS DUCT LINER

Thomas A. Auxier, Palm Beach Gardens; James B. Rannie, and Robert E. Field, both of Tequesta, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 31, 1988, Ser. No. 200,489
Int. Cl.[4] F24H *3/00*; F23R *3/08*
U.S. Cl. 165—47 8 Claims



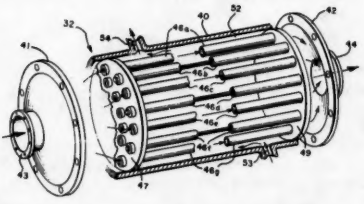
1. A liner for a hot gas duct having a hot gas flow therein:
a support frame;
a support surface forming a portion of said support frame and extending transverse to the gas flow;
a plurality of liner plates, each liner plate secured at the upstream end to said support surface;
supply means for supplying cooling air under each liner plate immediately downstream of said support surface;
each liner plate located to partially overlap a downstream adjacent liner plate on the gas side, whereby each liner plate has an exposed portion and a shielded portion; and
elongated depressions deeper than the thickness of said liner plate extending through the entire exposed portion of each liner plate.

4,887,664

HEAT EXCHANGER SYSTEM HAVING ADJUSTABLE HEAT TRANSFER CAPACITY

Joseph A. Nehrbauer, Orlando, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 7, 1987, Ser. No. 130,045
Int. Cl.[4] F28F *7/00, 27/02*
U.S. Cl. 165—76 16 Claims



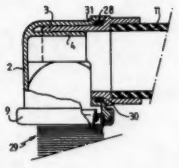
1. A heat exchanger system for transferring heat from a primary fluid circulation system to a secondary fluid circulation system wherein said heat exchanger system is subject to variable secondary fluid inlet temperatures, and the fluid in said secondary circulation system has a predetermined range of flow rates to accommodate temperature fluctuations and includes impurities subject to sedimentation at reduced flow rates, said heat exchanger system comprising:
a heat exchanger chamber;
means including a plurality of heat transfer tubes extending through said chamber defining a flow path for fluid in said secondary circulation system;
means defining a flow path through said chamber for fluid in said primary circulation system whereby fluid in said primary system comes into thermal communication with said heat transfer tubes; and
flow control means including a pair of plug members fitted on respective ends of each one of a selected portion of said heat transfer tubes and means for drawing said plug members together into supported liquid-sealed compression with said ends for selectively plugging said portion of said heat transfer tubes whereby fluid flow through the unplugged tubes is increased to reduce sedimentation of said impurities in said remaining tubes.

4,887,665

CONNECTION SYSTEM FOR INTERCONNECTING A HEAT EXCHANGER AND A PIPE UNION

Gilles Briet, Gueugon, France, assignor to Hutchinson, France

Filed Feb. 2, 1989, Ser. No. 305,745
Claims priority, application France, Feb. 2, 1988, 88 01188
Int. Cl.[4] F28F *9/00*
U.S. Cl. 165—76 16 Claims



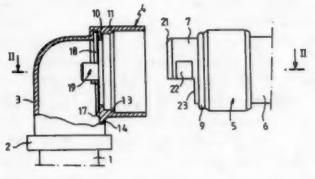
1. A connection system for interconnecting a heat exchanger and a pipe union, in which the pipe union opens out into an opening in the water box of the heat exchanger and is fixed firstly to a flexible pipe by means of a permanent connection and secondly to the water box by means of a resilient connection which is easily disassembled, with sealing between the pipe union and the water box being provided by an elastomer sealing ring which is radially compressed therebetween, and connection system including the improvement of an axially projecting first guide means fixed to the pipe union and a second guide means fixed to the inside surface of the water box and having a configuration enabling it to co-operate with the first guide means.

4,887,666

CONNECTION SYSTEM FOR INTERCONNECTING A HEAT EXCHANGER AND A PIPE UNION

Gilles Briet, Gueugnon, France, assignor to Hutchinson, France

Filed Feb. 2, 1989, Ser. No. 305,782
Claims priority, application France, Feb. 2, 1988, 88 01189
Int. Cl.[4] F28F *9/00*
U.S. Cl. 165—76 1 Claim



1. A connection system for interconnecting a heat exchanger and a pipe union, in which the pipe union which opens out into a connection tube of the water box of the heat exchanger is

fixed on a permanent basis to a flexible pipe and is releasably fixed to the connection tube via an easily released resilient connection, with sealing between the pipe union and the connection tube being by an elastomer ring interposed therebetween, said resilient connection being constituted by a locking device comprising fingers carried by a ring which is received inside the water box coaxially with the connection tube, said fingers being directed towards the axis of said connection tube and being radially resilient, notches being provided in the leading end of the pipe union for receiving the resilient locking fingers by snap-fastening when the pipe union is assembled with the connection tube, said connection system including the improvement whereby said ring which is permanently fixed inside the water box is received in part in a substantially semicircular groove formed in a portion of the inside wall of the water box from which said connection tube projects, and bears as a force-fit against a swelling which is diametrically aligned with the same groove and which is disposed in a facing and symmetrical position about the location of said groove, with the leading end of the pipe union having a portion of its periphery omitted, said omitted portion extending between the locations of said notches and extending over an axial length which is slightly greater than the width of the notches, there being two of said locking fingers disposed at opposite ends of a diameter perpendicular to the diameter of symmetry of said groove.

4,887,667

DEVICE FOR PROVIDING COMMUNICATION BETWEEN WATER TANKS OF HEAT ACCUMULATION TANK SYSTEM

Takashi Kuhara, 20-16, Kamiyama-cho, Shibuya-ku, Tokyo 150, Japan

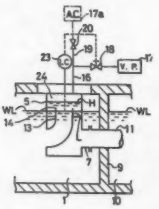
PCT No. PCT/JP87/00715, § 371 Date Jun. 1, 1988, § 102(e) Date Jun. 1, 1988, PCT Pub. No. WO88/02455, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 30, 1987, Ser. No. 208,416

Claims priority, application Japan, Oct. 1, 1986, 61-233735; Sep. 1, 1987, 62-218865

Int. Cl.[4] F24D *11/00*; F04F *10/00*

U.S. Cl. 165—96 **37 Claims**



7. In a heat accumulating tank system having a plurality of water tanks separated by partition walls, a communication control device for controlling the state of communication between two adjacent water tanks of said system, comprising: a control tank defining in one of said two adjacent water tanks a closed control chamber; a riser pipe having one end opened to the outside of said control tank at a level below the normal water level in one of said two adjacent water tanks and the other end rising through said control tank so as to open at its upper end in an upper portion of said control chamber; a passage through which said control chamber is connected to the other of said two adjacent water tanks; and pressure control means for controlling the pressure in an upper portion of said control chamber.

4,887,668

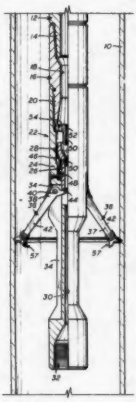
CUTTING TOOL FOR CUTTING WELL CASING

Gerald D. Lynde, Bossier City, and James M. Price, Mansfield, both of La., assignors to Tri-State Oil Tool Industries, Inc., Bossier City, La.

Continuation-in-part of Ser. No. 816,287, Jan. 6, 1986, Pat. No. 4,796,709. This application Nov. 6, 1986, Ser. No. 927,512

Int. Cl.[4] E21B *29/00*

U.S. Cl. 166—55.8 **27 Claims**



1. A cutting tool mounted for rotation within a well for cutting a casing therein during rotation and comprising:

a tubular cutter body having a longitudinally extending slot therein and adapted to be connected to a well string for being lowered within a well and being surrounded by casing to be cut;

an elongate cutter arm received within said slot and having a cutting means adjacent its lower end;

means on the cutter body mounting the upper and portion of said cutter arm in said slot for pivotal movement to permit the outward swinging movement of said cutting means into cutting contact with the inner periphery of the adjacent casing to be cut;

means associated with said cutting tool and selectively actuated at a predetermined well depth to move the lower end of the arm outwardly for said cutting means to engage the casing in a cutting operation;

said cutting means comprising

a cutting blade mounted on the lower end of said arm and extending in a generally radial direction therefrom, said blade including a base having a leading surface with respect to the rotational axis of said cutting tool during the cutting operation; and

a plurality of cutting inserts of a predetermined generally similar size and shape secured in a predetermined pattern to said leading surface of said base, each of said cutting inserts having an exposed front cutting face, an opposed rear face secured to the leading surface of said base, and a peripheral surface extending between said faces defining a relatively lower sharp cutting edge at the juncture of the peripheral surface and front face, the lower cutting edge of each cutting insert having, prior to wear, a generally arcuate lowermost intermediate portion and adjacent opposed side portions inclined upwardly from said intermediate portion to continually present a relatively sharp cutting surface to the casing during the cutting operation;

said cutting inserts being positioned in closely spaced side-by-side relation to each other on the leading surface of each blade in a plurality of closely spaced parallel rows extending generally longitudinally along the arm and in a plurality of closely spaced parallel rows extending gener-

ally transversely of said arm, with the front faces and associated cutting edges of the lowermost cutting inserts defining a lower generally continuous cutting surface which is progressively worn away during the cutting operation.

4,887,669

WELL CLOSURE ASSEMBLY WITH CAP-TO-CASING ADAPTER

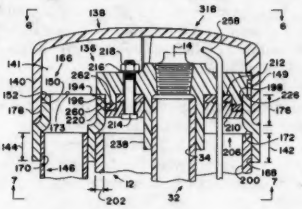
Cecil H. Paulus, Rte. 2, Box 495, Leesburg, Ind. 46538

Continuation of Ser. No. 178,682, Apr. 7, 1988, Pat. No. 4,842,060, Continuation-in-part of Ser. No. 39,942, Apr. 20, 1987, Pat. No. 4,785,881. This application Feb. 1, 1989, Ser. No. 304,546

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.[4] E21B *33/00, 33/04*

U.S. Cl. 166—75.1 **25 Claims**



1. A well closure assembly (**318**) for use with a well having a well casing (**12**) that includes a longitudinal axis (**14**) and a top (**28**) that is orthogonal to said axis, which well closure assembly comprises:

a support plate (**136**) having means (**34**) for supporting a well pipe (**43**) in said well casing;

well cap means (**138**) for closing said well; and

an adapter (**166**) being inserted between said well casing and said well cap means, having means (**168, 172**) for operatively engaging said well casing, having means (**176**) for operatively engaging said well cap means, having means (**170**) for operatively attaching an electrical conduit (**146**) to said adapter, having means (**173, 190**) for operatively engaging said support plate, and having means (**198**) for selective rotational positioning of said support plate with respect to said means for operatively attaching said electrical conduit.

25. A well closure assembly (**318**) for use with a well having a well casing (**12**), which well closure assembly comprises:

a support plate (**136**) having means (**34**) for supporting a well pipe in said well casing;

a well cap (**138**) having means, comprising a flange (**140**), for enclosing said support plate; and

an adapter (**166**), being inserted between said well casing and said well cap, for supporting said support plate above said top of said well casing.

4,887,670

CONTROLLING FRACTURE GROWTH

David L. Lord, Marlow; Buddy W. McDaniel; Lawrence E. Harris, both of Duncan, all of Okla., and J. E. Manrique, Bradford, Pa., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 5, 1989, Ser. No. 333,515

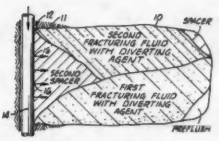
Int. Cl.[4] E21B *43/267*

U.S. Cl. 166—281 **20 Claims**

1. A method of controlling the growth of one or more vertically oriented fractures in a subterranean formation during a fracturing treatment therein comprising:

introducing a first fracturing fluid into said formation and into at least one fracture formed therein, said first fracturing fluid having a known density and containing a diverting agent;

introducing a second fracturing fluid into said fracture having a known density different from density of said first fracturing fluid whereby said second fracturing fluid selectably the overrides or underrides said first fracturing



fluid and forces said first fracturing fluid to the bottom or top of said fracture whereby said diverting agent contained therein is caused to screen out along the bottom or top of said fracture and to thereby impede further downward or upward growth of said fracture; and

continuing the introduction of said second fracturing fluid into said fracture until said fracture is extended a desired amount.

4,887,671

FRACTURING WITH A MIXTURE OF CARBON DIOXIDE AND ALCOHOL

James F. Stevens, Jr., Houston, Tex., assignor to Texaco, Inc., White Plains, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,094

Int. Cl.[4] E21B *43/26, 43/267*

U.S. Cl. 166—308 **7 Claims**

1. A method of fracturing an underground, formation penetrated by a wellbore, which consists essentially of:

injecting into an underground formation through a wellbore a mixture of carbon dioxide and a polar alcohol or polar glycol additive at a temperature and pressure above the critical temperature and pressure of carbon dioxide,

said alcohol or glycol additive having less than about 9 carbon atoms and comprising about 0.1% to about 10% by weight of the injected mixture;

said mixture injected with sufficient volume and pressure to cause a fracture to be formed in said underground formation.

4,887,672

SUBSEA WELLHEAD WITH ANNULUS COMMUNICATING SYSTEM

Joseph H. Hynes, Houston, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 285,585

Int. Cl.[4] E21B *33/035*

U.S. Cl. 166—344 **9 Claims**

1. A subsea wellhead comprising

a wellhead housing having an interior surface, an upper surface and a landing seat at the lower end of the inner surface,

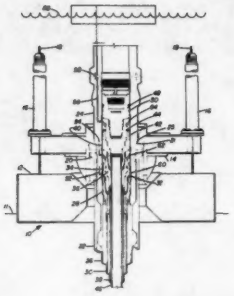
a series of hangers landed within said wellhead housing, each of said hangers having an exterior sealing surface,

a series of seal assemblies having a seal for sealing between the exterior sealing surface of a hanger and the interior surface of said wellhead housing,

the sealing of said seal assemblies providing a plurality of annuli between the hangers and the wellhead housing,

a plurality of passages in said wellhead housing communicating from the upper surface of said wellhead housing to said annuli with each of said passages communicating with a single one of the annuli,

means associated with said passages for isolating said annuli from each other and to prevent flow from one annulus into another, and



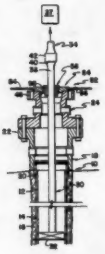
means for communicating fluid pressure changes at the upper surface of said wellhead housing to said surface.

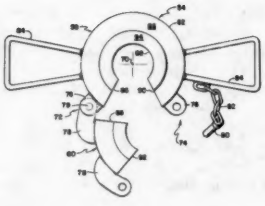
4,887,673

TECHNIQUE FOR COMPLETING SHALLOW WELLS WITH TENSION PACKER

Thomas S. Skoruppa, 11021 Mulholland, Corpus Christi, Tex. 78410

Filed Feb. 4, 1988, Ser. No. 152,250
Int. Cl.[4] E21B *19/10*
U.S. Cl. 166—382 **20 Claims**





1. A method of completing a well having a casing string extending into the earth and a well head assembly attached to the casing string and providing a support, comprising the steps of

running a tubing string less than 2000' long into the well having a tension held hold down device thereon by periodically supporting the tubing string on the well head support with a first set of fluid actuated slips;

removing the first set of fluid actuated slips from the well head assembly while the tubing string is supported from a travelling block of a rig;

moving a bowl laterally of the tubing string to a position surrounding the tubing string and supporting the bowl on the well head support;

pulling upwardly on and stretching the tubing string with the travelling block; then

placing a second set of slips in the bowl, gripping the tubing string with the second set of slips, lowering the travelling block and transferring the weight of the tubing string through the second set of slips and bowl to the well head support; then

detaching the travelling block from the tubing string, attaching a Christmas tree to the tubing string, attaching the travelling block to the Christmas tree and pulling upwardly thereon for transferring the weight of the tubing string to the travelling body; then

removing the second set of slips from the bowl and away from the tubing string; then

removing the bowl from the position surrounding the tubing string in a direction laterally of the tubing string; then

lowering the Christmas tree to adjacent the well head support and coupling the Christmas tree to the well head.

5. A combination bowl-slips assembly, comprising:

a trap door bowl including

an annular flange having a single substantially central opening therethrough tapering from a large upper end toward a small lower end and providing

a flat annular bottom face for support on an upwardly facing flange of a well head support and

an annular projection, surrounding the flange opening, radially inwardly of the flat bottom face and extending downwardly therefrom for receipt in a central opening of the well head support, the tapering of the central opening extending into the projection,

the flange comprising a first major segment defining an arc substantially greater than 180° and a second minor segment defining an arc substantially less than 180° separated along first and second spaced upright parting lines, and means mounting the second segment in a path of movement on the first segment between a first closed position providing a slips support and a second open position spaced from the first segment providing an opening in the major flange segment providing a path for moving the major flange segment radially toward and away from a tubing string for positioning the trap door bowl about the tubing string, the mounting means comprising a first pin perpendicular to the path of movement connecting a first end of the second segment to the first segment; and

means securing the first and second segments together including a second pin perpendicular to the path of movement connecting a second end of the second segment to the first segment; and

a set of slips, received in the bowl opening, including

a plurality of downwardly tapering slip segments providing a central slip opening therebetween providing an axis, a downwardly tapered outer surface engaging the tapered bowl opening and a multiplicity of teeth for gripping the tubing string;

the slips being separable from the bowl and from the bowl opening.

4,887,674

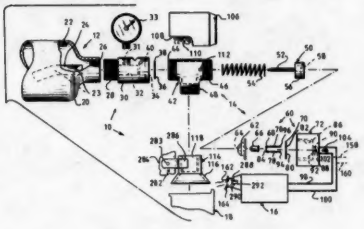
CARTRIDGE OPERATED FIRE EXTINGUISHER

David G. Galosky, 8205 Hammond Branch Way, Laurel, Md. 20707, and Victor r. Lougheed, 8705 Rooper Rd., Baltimore, Md. 21234

Filed Mar. 22, 1988, Ser. No. 171,796
Int. Cl.[4] A62C *37/22*
U.S. Cl. 169—61 **8 Claims**

1. Fire extinguisher apparatus comprising: fire extinguisher medium storing means for storing a fire extinguishing medium;

fire extinguisher medium release means operatively connected to said fire extinguisher medium storing means for releasing the fire extinguishing medium from said fire extinguisher medium storing means, said fire extinguisher medium release means comprising a replaceable propellant cartridge and means located external to said replaceable propellant cartridge for activating said replaceable propellant cartridge; electronic detection and release activation means operatively connected to said fire extinguisher medium release means for detecting a suspected fire, determining that it is a fire and activating said



fire extinguisher medium release means, said electronic detection and release activation means comprising a thermal detector, a light detector and electronic activating means connected to said thermal detector and said light detector for preventing activation of said fire extinguisher medium release means until both said thermal detector and said light detector are activated; and an independent source of power for said fire extinguisher apparatus comprising a battery operatively connected to said electronic detection and release activation means and battery indicator means associated with said battery for indicating when said battery needs replacing.

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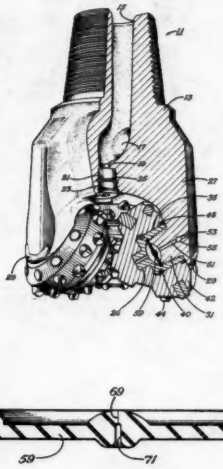
flexible diaphragm to limit pressure build-up in the lubricant region by discharging lubricant into the drilling fluid



region of the cavity when the lubricant pressure exceeds the drilling fluid pressure.

4,887,675

EARTH BORING BIT WITH PIN MOUNTED COMPENSATOR

Duane E. Shotwell, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 1,313, Jan. 8, 1987, abandoned. This application Aug. 8, 1988, Ser. No. 231,632

Int. Cl.[4] E21B *10/22*

U.S. Cl. 175—228 **3 Claims**

1. In a combination with an earth boring bit of the type utilizing a cantilevered and generally cylindrical bearing sleeve threaded onto a bearing lug and retainer means to retain a sealed earth disintegrating cutter on the sleeve, an improved lubrication system which comprises:

a cavity formed generally coaxially with and between the end of the bearing lug and the bearing sleeve and defining an annular seal groove between the end of the lug and the bearing sleeve;

a flexible diaphragm with an annular periphery forming an annular seal means generally coaxially and sealingly secured in the cavity and having an area generally as large as the end of the bearing lug to divide the cavity into a lubricant region and a drilling fluid region and permit movement of the diaphragm in two directions;

lubricant passage means formed through the end of the bearing sleeve to connect the lubricant region of the cavity to the bearing surface;

drilling fluid passage means formed through the center of the lug to connect the drilling fluid region to the exterior of the bit;

one way pressure relief means in a central portion of the

4,887,676

DEVICE FOR CLOSING A CORE BARREL INSTALLED IN A DRILLING RIG

Charles P. Hallez, Tellin, Belgium, assignor to Diamant Boart Societe Anonyme, Brussels, Belgium

Filed Apr. 14, 1988, Ser. No. 181,347

Claims priority, application Belgium, Apr. 14, 1987, 8700395

Int. Cl.[4] E21B *25/10*

U.S. Cl. 175—250 **10 Claims**

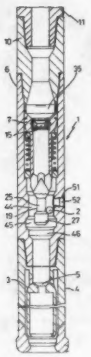
1. A device for closing an upper end of a core barrel installed in equipment for drilling for minerals or oil, comprising a tube element in the line of pipes and in whose bore there is guided a sliding member means which provides a passage for drilling liquid under pressure, this sliding member means being caused to perform a first movement under the influence of an increase in the flow of drilling liquid between an initial rest position and a remote stable position in which it keeps a closing element remote from a seat provided at the upper end of the core barrel and being brought back under the influence of a subsequent reduction of flow to its initial position in which it allows this closing element to apply itself to the above-mentioned seat;

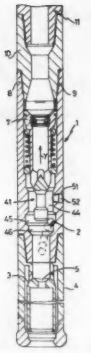
wherein the closing element is separate from the sliding member means;

wherein the closing element is a solid metal ball; and

wherein the sliding member means is provided, at a lower end, with an attachment directed towards the upper end of the core barrel, this attachment being provided with a protuberance having a form such that, in the initial rest position of the sliding member means, the attachment holds the ball in a first section of the bore of the tubular element whereas, in the remote stable position, the protu-

berance holds the ball in a second section of the bore in the tubular element and allows the ball to be released towards





the seat of the core barrel when the sliding member means re-occupies its initial position.

4,887,677

LOW PRESSURE DRILL BIT

Tommy M. Warren, Coweta, and Suzanne M. Behr, Tulsa, both of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Nov. 22, 1988, Ser. No. 274,592
Int. Cl.[4] E21B *10/60*
U.S. Cl. 175—339 **9 Claims**

1. A drill bit, comprising:

a bit body, including:

a main body portion;

a protuberant body portion extending forward, to a free end thereof, from said main body portion; and

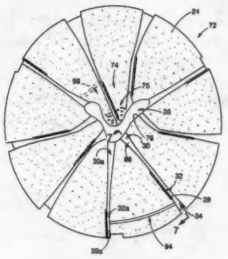
a fluid flow passage defined through said main and protuberant body portions;

a first cutting member disposed on said main body portion;

a second cutting member disposed on said protuberant body portion;

first fluid course means on said main body portion for defining a first fluid course including a first throat, disposed in front of said first cutting member, and further including a first diffuser, extending from said first throat, said first throat communicating with said fluid flow passage; and

second fluid course means on said protuberant body portion for defining a second fluid course including a second throat, disposed in front of said second cutting member, and further including a second diffuser, extending from



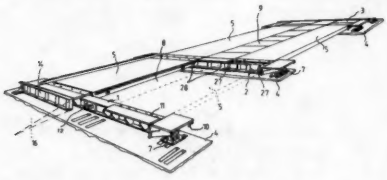
said second throat, said second throat communicating with said fluid flow passage.

4,887,678

DEVICE FOR WEIGHING VEHICLES

Jean-Luc Largenton, 9, rue des Parmentiers, Metz, France (57000)

Filed Dec. 22, 1988, Ser. No. 288,700
Claims priority, application France, Dec. 24, 1987, 87 18159
Int. Cl.[4] G01G *19/02, 21/22*
U.S. Cl. 177—134 **13 Claims**



1. Device for weighing vehicles, comprising a floor which has a general rectangular shape and is supported on a base by means of force sensors, said floor consisting of at least two panels which are arranged so as to bear at their ends on a t least two cross beams resting at their ends on said sensors, said cross beams having, at their ends, surfaces resting on the sensors, the sensors being arranged so as to rest on the base, said surfaces a the ends of each of the beams being offset towards the upper side of the beam.

4,887,679

SELF-CLEANING WEIGHING HOPPER AND DRIVE MECHANISM

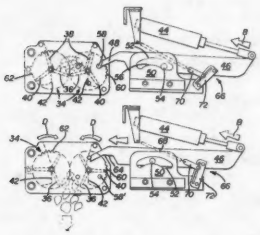
Forrest C. Bacon, and Dale E. Pribbernow, both of Decatur, Ga., assignors to Kliklok Corporation, Decatur, Ga.

Filed Apr. 26, 1989, Ser. No. 343,435
Int. Cl.[4] G01G *23/00, 19/00*
U.S. Cl. 177—245 **9 Claims**

1. A self-cleaning weighing hopper for use in a weighing apparatus for sticky products or the like comprising:

side walls defining said hopper;

at least one panel extending across said hopper and forming the bottom thereof; and



means for cleaning said panel of the product during operation of the hopper.

4,887,680

DEVICE FOR CONNECTING WORK MACHINE TO TRACTOR

Kenkichi Nozaka; Yoshihiro Kawahara; Takashi Fukutaka, and Fumiharu Horie, all of Osaka, Japan. assignors to Kubota Ltd., Osaka, Japan

Filed Sep. 1, 1988, Ser. No. 239,758

Claims priority, application Japan, Sep. 3, 1987, 62-221721; Sep. 14, 1987, 62-230844

Int. Cl.[4] B60K *25/00*

U.S. Cl. 180—53.3 **11 Claims**

1. A device for removably connecting a tractor having a PTO shaft with a work machine having a power input shaft with a male spline-ended portion, the work machine also having means for connection at an upper connecting position and two lower positions thereof, the connecting device comprising:

(a) three-point link assembly means having a pair of opposite lower links and a top link, all of said links being pivotally mounted to the tractor for upward and downward movement;

(b) lift means for moving all of the links of the three-point link assembly means upward and downward;

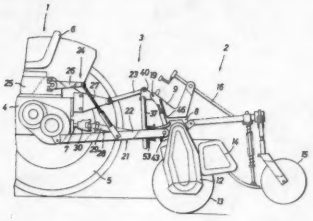
(c) an axially movable power transmission shaft having universal joints at a rearward and forward end thereof, the forward end of the shaft being connected to the PTO shaft through a front universal joint and the rearward end of the shaft being removably connected to the male spline-ended portion of the input shaft through a rear universal joint, the rear universal joint having a female spline coupling which is removably coupled to the male spline-ended portion;

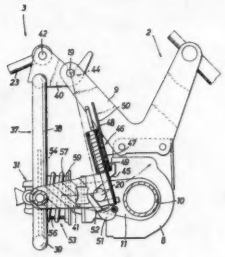
(d) a connector interconnecting the lower links and the top link;

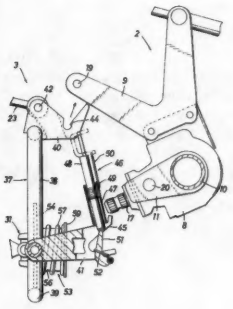
(e) an upper engaging portion mounted at an upper position of the connector for removably coupling at an upper connecting position of the work machine;

(f) lower engaging portions mounted at lower positions of the connector, said lower engaging portions being removably coupled at the lower connecting positions of the work machine; and

(g) a coupling assembly provided centrally of the connector for removably connecting said rearward end of the transmission shaft to the input shaft of the work machine, the coupling assembly comprising a tubular case rotatably supporting said rear universal joint axially fixed relative to the transmission shaft, and also comprising resilient support means for buffering misalignment when the female spline coupling of said rearward end of the transmission







shaft is coupled to the male spline-ended portion of the input shaft.

4,887,681

MOTOR VEHICLE, ESPECIALLY PASSENGER MOTOR VEHICLE

Juergen Durm, Ditzingen, and Dieter Wagner, Oberriexingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 245,642

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1987, 3735185

Int. Cl.[4] A47C *7/72*

U.S. Cl. 180—68.1 **22 Claims**

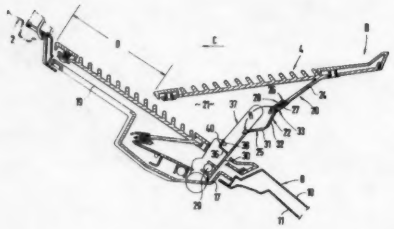
1. A spoiler arrangement for a rear engine driven motor vehicle comprising:

a spoiler extending laterally across a rear section of a vehicle and covering at least a portion of an opening to a vehicle engine accommodating space:

spoiler mounting means for mounting the spoiler for movement between an inoperative position substantially flush with adjacent exterior vehicle body parts and an operative position spaced outwardly from adjacent exterior vehicle

body parts to enhance the vehicle aerodynamic characteristics; and

cover element means for covering gaps formed between the spoiler and adjacent exterior vehicle body parts forming the opening when the spoiler is in said operative position whereby sucking in of exhaust gases and other contamination to said space from the rear of the vehicle rear is reliably prevented;



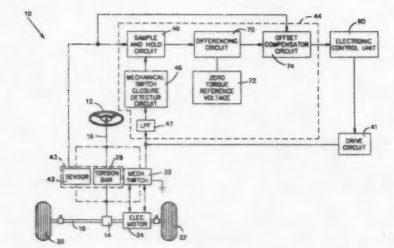
wherein said cover element means includes a first cover member part extending laterally across a rearward portion of the spoiler and fixed thereto, a second cover member part mounted at vehicle body, and a foldable cover member part interconnected between the first and second cover member parts, said foldable cover member part being configured to form a plurality of folds when the spoiler is in the inoperative position with the foldable cover member part stowed in the vehicle body.

4,887,682

METHOD AND APPARATUS FOR NULLIFYING ELECTRICAL OFFSETS IN A TORSION SENSOR

Gilbert H. Drutchas, deceased, late of Birmingham, Mich. (by Elain M. Drutchas, legal representative), and John S. Borza, Sterling Heights, Mich., assignors to TRW Inc., Lyndhurst, Ohio

Filed Jan. 6, 1988, Ser. No. 142,837
Int. Cl.[4] B62D 5/04
U.S. Cl. 180—79.1 **4 Claims**



1. A power assist steering system having a vehicle steering wheel operatively connected to steerable wheels of the vehicle through a torsion bar, applied steering torque twisting the torsion bar, said power steering system including:

power assist means operatively connected to vehicle steering linkage for, when energized, providing power assist to an operator applied steering maneuver;

an electrical control signal having a value;

drive circuit means for energizing said power assist means in response to said value of said electrical control signal;

torsion sensing means for providing an electrical torsion signal having a value that varies as a function of applied steering torque;

means for detecting when no steering torque is applied and when steering torque is applied, said detecting means providing a first electrical signal when steering torque is applied and a second electrical signal when no steering torque is applied;

means responsive to said detecting means for measuring a value of said electrical torsion signal from said torsion sensor when the signal provided by said detecting means changes between said first electrical signal and said second electrical signal and for providing an output signal having a value indicative of the measured value of said electrical torsion signal;

means for providing a zero torque reference voltage having a predetermined value;

means for comparing said output signal from the measuring means against said value of said zero torque reference voltage and for providing an electrical output signal having a value equal to the difference therebetween;

compensating circuit means electrically connected to said torsion sensing means and said means for comparing, said compensating circuit means providing an electrical, compensated torsion signal having a value equal to the value of said electrical torsion sensing signal from said torsion sensing means offset by the value of the electrical output signal from said means for comparing; and

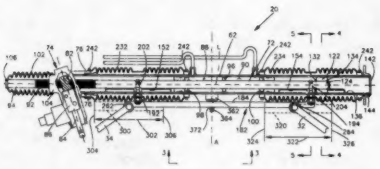
control circuit means electrically connected to said compensating circuit means and to said drive circuit means for providing said electrical control signal having a value responsive to the output signal of the compensating circuit means.

4,887,683

RACK AND PINION STEERING GEAR WITH INTERMEDIATE TAKE-OFF

Edwin G. Klosterhaus, Livonia, and Robert E. Feindel, Sterling Heights, both of Mich., assignors to TRW Inc., Lyndhurst, Ohio

Filed Nov. 8, 1988, Ser. No. 268,505
Int. Cl.[4] B62D 5/04
U.S. Cl. 180—148 **20 Claims**



1. An apparatus for steering a vehicle having a longitudinal central axis, said apparatus comprising:

a pinion gear;

a rack member for meshing engagement with said pinion gear and being movable in a path extending transverse to the longitudinal central axis of the vehicle;

a bridge member attached to said rack member and movable upon movement of said rack member, said bridge member having a portion co-extensive with said rack member;

first means on said bridge member for attachment of a first tie rod intermediate the axial ends of said rack member, during steering of the vehicle said first means moving in a path located entirely on one side of the longitudinal central axis of the vehicle; and

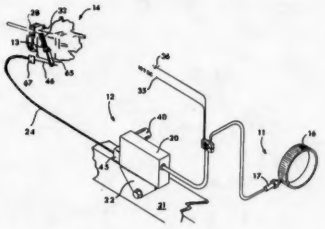
second means on said bridge member for attachment of a second tie rod intermediate the axial ends of said rack member, during steering of the vehicle said second means moving in a path located entirely on another side of the longitudinal central axis of the vehicle opposite the location of the path of movement of said first means.

4,887,684

VEHICLE SPEED LIMITING SYSTEM

Lael D. King, Minneapolis, Minn., assignor to Electronic Control Systems, Inc., Minneapolis, Minn.

Filed Oct. 30, 1987, Ser. No. 115,446
Int. Cl.[4] B60K *31/04*
U.S. Cl. 180—179 **17 Claims**



16. In combination with a governor for use with the fuel pump of a motor vehicle to limit the speed of the motor vehicle at a predetermined level and being of the type having a speed sensor and a throttle linkage, the improvement comprising an actuator connected to the speed sensor and receiving output signals therefrom and controlling the throttle linkage, said actuator comprising:

a. a control circuit processing said output signals to provide electrical control signals when the motor vehicle attains the predetermined level;

b. a motor communicatively connected to said control circuit and controlled thereby;

c. a rotatable, radial cam member connected to said motor by a shaft member through a gearbox;

d. position sensing means communicatively coupled with said cam member and with said control circuit, said position sensing means providing information on the angular position of a predetermined point on said cam member to said control circuit; and

e. a reel assembly coupled to said predetermined point on said cam member by a cable, said cable further being wound in said reel assembly and extending therefrom to the throttle linkage, said reel assembly having feedback means providing information to said control circuit on the rate of actuation.

4,887,685

STEERABLE MOTORIZED THREE-WHEELED VEHICLES FOR USE BY THE HANDICAPPED AND OTHERS DESIRING ASSISTANCE

Melvin E. Shepard, Bridgeport, and Allen L. Bussinger, Saginaw, both of Mich., assignors to Amigo Sales, Inc., Bridgeport, Mich.

Division of Ser. No. 179,747, Apr. 11, 1988, Pat. No. 4,846,295. This application Feb. 27, 1989, Ser. No. 315,485
Int. Cl.[4] B62D *61/12*; B62K *13/00*
U.S. Cl. 180—209 **3 Claims**

1. A steerable, powered, three wheeled vehicle comprising:

a. a frame comprising a front end and side sections joined to a generally horizontal rear frame section;

b. a platform spanning said frame;

c. a pair of laterally spaced apart rear wheels with hubs, supporting the rear frame section;

d. a front shell-like casing supported on said front end in stationary position to leave ample foot room on said platform laterally outwardly of said front casing;

e. a steerable front wheel partly covered by said front casing, journaled by the said front end for steerability, and supporting said front end;

f. an elevated seat supported on said rear frame section;

g. a steering post connected to said front wheel and extending upwardly at an angle at which it can be readily grasped by a seat occupant whose feet are resting comfortably on said platform;

h. rechargeable batteries carried on said vehicle;

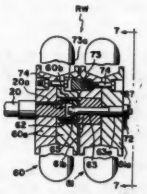
i. electric motor and drive mechanism on said rear frame section connected to drive said rear wheels;

j. said rear wheel hubs being keyed to a rear axle structure and having axial openings defining axial bores; auxiliary wheels having hub portions provided with projecting axial sleeves of a diameter to be received in said bores;

k. said rear axle structure having hollow cup end members on each end within said bores in said rear wheel hubs and defining axial cup cavities therein;

l. each hollow cup member having a radial end wall, with an axial passage therein communicating with an axial cup cavity, but of reduced diameter relative to said cavity;

m. a lock carried axially by the hub of each auxiliary wheel to protrude therefrom and of a diameter to be received in said passage when said auxiliary wheel is moved toward said rear wheel and said axial sleeve on the auxiliary wheel is received in the bore in the hub of the rear wheel, said lock having radially movable members, movable from a



radially inward collapsed position in which said lock is axially slidable through said passage into said cavity to a radially extended position within said cavity preventing said lock from being withdrawn from said cavity;

n. actuator means carried by said lock and normally maintaining said axially moving members in radially expanded position, movable to a position in which said axially movable members are permitted to return to radially inward position and permit said lock to be removed from said passage;

o. cam surfaces within said cavities for returning said radially moving members to radially inward position when said lock is moved axially in a direction to withdraw it from said passage and said actuator means is moved to said position in which the axially movable members are permitted to return to radially inward position; and

p. the rear wheel hubs and auxiliary wheel hubs having axially offset, aligned telescoping drive openings and projections which telescopically interfit when the auxiliary wheels are moved toward the rear wheels to pass said lock members through said passages.

4,887,686

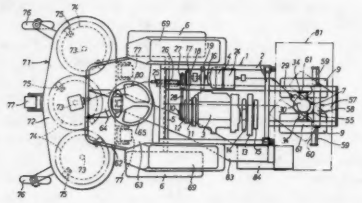
WORKING VEHICLE

Terutaka Takei; Shigeru Morita, and Hiroaki Kawakita, all of Osaka, Japan, assignors to Kubota ltd., Osaka, Japan

Filed Apr. 14, 1988, Ser. No. 183,700
Claims priority, application Japan, Apr. 15, 1987, 62-93727; Apr. 15, 1987, 62-58113; May 22, 1987, 62-126118
Int. Cl.[4] B62D *11/04*
U.S. Cl. 180—211 **31 Claims**

1. A working vehicle including a vehicle body having a pair of front wheels and a pair of rear wheels, steering means mounted on the vehicle body, and a working machine provided at the front end of the vehicle body, at least the rear wheels of the four wheels being drivingly rotatable and steerable, the working vehicle being characterized in that the steer-

ing means is disposed in the vicinity of the front wheels at the front portion of the vehicle body, the rear wheels being steerable between a forwardly directed position and a laterally directed position about a vertical axis approximately at the midportion between a pair of rear wheels, and



a front wheel differential is provided between the pair of front wheels, and the pair of front wheels are driven through the differential.

4,887,687

MOTORCYCLE FRAME

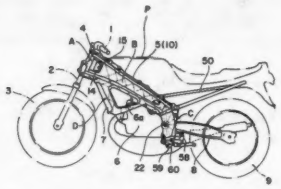
Susumu Asai, Kawagoe; Haruhide Sugimoto, Urawa; Masaru Fujisaki, Tokyo; Tadatoshi Shigetomi, Kawagoe, and Hisatoshi Kobayashi, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 207,967

Claims priority, application Japan, Jun. 19, 1987, 62-152604; Jun. 19, 1987, 62-152601; Jun. 19, 1987, 62-152602; Jun. 19, 1987, 62-152603; Jun. 19, 1987, 62-152605

Int. Cl.[4] B62K *11/06*

U.S. Cl. 180—219 **19 Claims**



1. A vehicle body frame for a motorcycle comprising:

a casting frame including a main frame portion for supporting an engine;

said casting frame being divided into a right and a left structure; and

said right and left structures being joined about a center line of the vehicle body for forming a vehicle body frame having a generally U-shaped configuration wherein the open portion of the U-shaped configuration is formed to open downwardly; and

a downwardly projecting portion depending from said main frame portion, wherein said downwardly projecting portion supports the engine.

4,887,688

MOTORCYCLE

Satoru Horiike, and Eiji Hamano, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,850

Claims priority, application Japan, Aug. 6, 1987, 62-195314; Sep. 25, 1987, 62-238661

Int. Cl.[4] B62D *61/08*; B62K *5/04*

U.S. Cl. 180—229 **11 Claims**

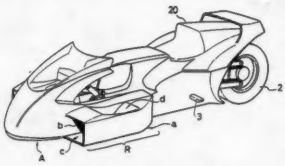
1. A motorcycle comprising:

a chassis frame including a front frame suspending a front wheel and a main frame suspending a rear wheel,

said front frame and said main frame being connected together by means disposing said front frame forward of said main frame,

said means including a connecting axle disposed between said main frame and said front frame;

said front frame being supported on said connecting axle for swinging movement toward each side of said chassis,



said rear wheel having a width sufficient to prevent said main frame from turning relative to said connecting axle,

a non-swingable front cowling supported by said main frame and covering a forward part of said motorcycle supported by said front wheel and said front frame, and

an extension projecting laterally outwardly from each respective side of said front cowling wherein said front cowling and said extension maintain a generally parallel condition relative to the ground when said front frame moves toward either side of said chassis.

4,887,689

DRIVING FORCE DISTRIBUTION CONTROL SYSTEM FOR 4WD VEHICLE

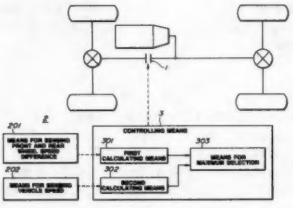
Genpei Naito, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 30, 1988, Ser. No. 277,746

Claims priority, application Japan, Nov. 30, 1987, 62-302473

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—233 **10 Claims**



1. A driving force distribution control system for a vehicle, comprising:

clutch means provided in a drive system of the vehicle for varying a driving force transmitted therethrough to vary a driving force distribution between front and rear wheels in response to a control signal,

sensing means comprising first detecting means for determining a front and rear wheel speed difference, and second detecting means for determining a vehicle speed, and

controlling means for controlling a clutch engagement force of said clutch means to control the driving force distribution by producing said control signal, said controlling means comprising first calculating means for determining a first clutch engagement force in accordance with said front and rear wheel speed difference, second calculating means for determining a second clutch engagement force in accordance with only said vehicle speed, and selecting means for determining a desired clutch engagement force

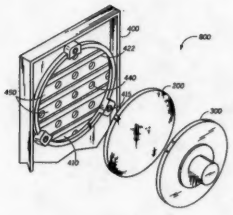
which is equal to said first engagement force when said first force is equal to or greater than said second force, and which is equal to said second engagement force when said second force is greater than said first force.

4,887,690

SPEAKER GRILLE ASSEMBLY

Bakulesh B. Patel, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 2, 1988, Ser. No. 278,893
Int. Cl.[4] H05K 5/00
U.S. Cl. 181—150 **5 Claims**



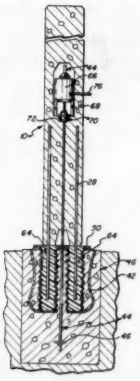
1. A speaker grille assembly comprising in combination:
a grille having a front surface and a rear surface with plurality of channels therethrough for passage of sound, said channels providing interconnected front and rear ports, said rear surface including at least one recessed area about said rear port, said recessed area being substantially greater than the area of said front ports,
a speaker positioned to the rear of the grille, and
a sheet of porous material positioned between said rear surface and the speaker, the recessed area effectively increasing the sound passage of said grille assembly.

4,887,691

MODULAR WALL CONSTRUCTION USING POSTS AND PANELS

Richard J. Rotondo, Sellersville, Pa., assignor to Rotondo/-Penn-Cast, Telford, Pa.

Filed Nov. 4, 1988, Ser. No. 267,388
Int. Cl.[4] E02D 29/02; E04H 17/00
U.S. Cl. 181—210 **24 Claims**



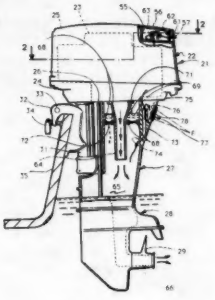
1. In a post structure for a post and panel wall system in which vertical side edges of panels are seated in channels in posts, the combination comprising:
(a) a concrete foundation having a top surface and a plurality of horizontally spaced, vertically extending cavities opening at the top surface of said foundation, and a tensioning cable embedded therein and extending upwardly therefrom intermediate said cavities;
(b) a vertically elongated precast concrete post having a top end, bottom end and sides, said post also having a plurality of anchoring rods depending from said bottom end thereof and positioned in said cavities of said foundation, said post having channels on opposite sides thereof adapted to receive the vertical side edges of associated panels, said post having a passage extending horizontally therethrough at a point spaced from said bottom end thereof and a second passage extending vertically from said horizontal passage to said bottom end of said post, said cable of said foundation extending upwardly through said vertical passage to said horizontal passage;
(c) tensioning means on said cable in said horizontal passage to retain said cable in tension; and
(d) a cementitious material in said foundation cavities about said anchoring rods to firmly secure said anchoring rods in said foundation.

4,887,692

NOISE REDUCING DEVICE FOR MARINE PROPULSION

Hiroaki Outani, and Seiji Inoue, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 12, 1988, Ser. No. 180,539
Claims priority, application Japan, Apr. 13, 1987, 62-90403
Int. Cl.[4] F01N 1/06
U.S. Cl. 181—235 **21 Claims**



1. In a marine propulsion unit comprised of an internal combustion engine having an output shaft, a marine propulsion device driven by said engine output shaft, said engine having an induction system comprised of an atmospheric air inlet device for delivering an air charge to said engine for combustion, and an exhaust system having an exhaust outlet device for discharging exhaust gases from said engine to the atmosphere, the improvement comprising an acoustical lens extending at least in part across at least one of said devices for silencing sound waves emanating therefrom.

4,887,693

WIND AND BREATH NOISE PROTECTOR FOR MICROPHONES

Gerald W. Plice, Morton Grove, Ill., assignor to Shure Brothers, Inc., Evanston, Ill.

Filed Jun. 24, 1987, Ser. No. 65,970
Int. Cl.[4] F01N 7/00
U.S. Cl. 181—242 **1 Claim**

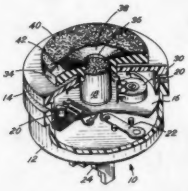
1. A radio or telephone handset microphone housing con-

struction for reducing wind and breath generated air passage noise, the construction comprising, in combination:

a cup defining a first circular inner surface and a second inner surface, the second inner surface forming a lip contiguous with the first inner surface and having terminals for providing electrical connections;

a circuit board comprising a microphone having a circular sound transducer aperture, the circuit board removably resting on the lip and electrically connected to the terminals;

a removable cover defining a flat outer surface and a cylindrical sleeve extending perpendicularly outward from the flat outer surface, the flat outer surface having a circular opening to allow passage of the transducer aperture, the cover being mateable with the cup by sliding the cylindrical sleeve into the first inner surface of the cup, whereby the cover and cup are frictionally connected and the transducer aperture is generally flush with the flat outer surface;



an adapter comprising flexible material, loosely mounted and mateable with both the transducer aperture and flat outer surface, the adaptor further comprising an expansion plate having a greater diameter than the transducer aperture, the plate defining a sound transmission passage having an opening of smaller diameter than the transducer aperture and having a receptacle configured to conform and frictionally connected to the transducer aperture, the plate further having a flat portion and a sound receiving side away from the transducer aperture configured with a concave taper from the vicinity of the plate's rim to the sound transmission passage; and

a circular filter screen comprising non-woven fabric loosely mounted and conforming to the diameter of the plate and mounted on the flat portion of the plate over the concave taper of the plate to reduce incremental pressure differences on the transducer aperture.

4,887,694

HIGH RISE BUILDING FIRE ESCAPE/FIRE FIGHTING AND BUILDING MAINTENANCE SYSTEM

I-Chung Ho, 60958 Grovespring Dr., Rancho Palos Verdes, Calif. 90274

Division of Ser. No. 931,222, Nov. 14, 1986, Pat. No. 4,828,072. This application Oct. 27, 1988, Ser. No. 263,599

Int. Cl.[4] A62B *1/20*

U.S. Cl. 182—82 **17 Claims**

1. A combination fire escape and fire fighting and maintenance system comprising:

a column on the exterior of a high rise building;

user controlled means for escape;

auxiliary powered means for rescue;

a housing;

a user platform securely attached to said housing;

means for driving said lifts up and down a column mounted to a building and having a gear-toothed track;

two shafts extending through said housing;

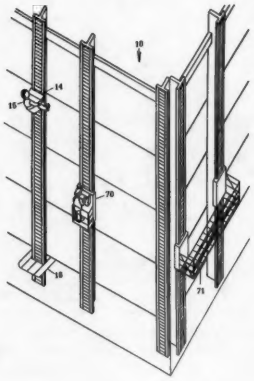
a pair of locking bars, each locking bar mounted to one end of the shaft outside of said housing;

a pair of clamping levers, each one mounted to the other end of said shafts;

guide blocks mounted to the housing, said shafts rotatable within said guide blocks;

a clamping pin mounted to each of said locking bars and clamping levers at one end thereof;

a clamping arm extending out of said housing and including a portion which forms a cavity between itself and the housing in the cross-sectional shape of the column, and including a block member attached to the clamping arm



within said housing; said block members including a curved surface thereon and having slots therein to accommodate said clamping pins;

rollers mounted to the clamping arm portion which extends from said housing;

wherein said column is clamped between said rollers and said means for driving when said clamping levers and locking bars are moved to a generally perpendicular position with respect to said column; and

braking means for slowing or stopping said lift.

4,887,695

POSITION CONTROL METHOD AND APPARATUS FOR AN ELEVATOR DRIVE

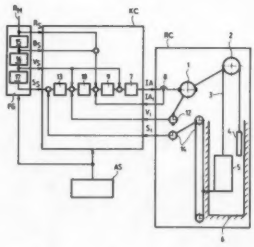
Gerhard Kindler, Meggen, Switzerland, assignor to Inventio AG, Switzerland

Filed Nov. 22, 1988, Ser. No. 275,005

Claims priority, application Switzerland, Nov. 27, 1987, 04647/87

Int. Cl.[4] B66B *1/30*

U.S. Cl. 187—116 **18 Claims**



1. A method for the distance control of a positioning drive having a cascade structure wherein, through specifying an

appropriate jerk input value and by a threefold integration over the time of the same, the control of a desired distance value takes place as well as the control of desired values of velocity and acceleration which are directly generated to subordinated velocity and armature current control circuits for forwrd correction, comprising the following steps:

a. defining a control distance which is the basis of a positioning drive as a standard control distance which can be influenced by interferences, and characterizing said standard control distance by a standardized set of values for the parameters of said control distance superimposed to which are parameter value changes caused by interferences;

b. adjusting a cascade control by fourfold forward correction to said standardized set of values for the parameters of said standard control distance including forward correcting a velocity controller by a specified desired velocity value, a current controller by a specified desired jerk value, and a control unit by said specified desired velocity value;

c. subdividing the interferences, which can have an effect on said standard control distance, into two classes, deterministic interferences which can be determined by a starting test and stochastic interferences which cannot be determined by a starting test;

d. quantitatively detecting said deterministic interferences by a starting test in a starting phase of every travel, forming a compensation signal therefrom which completely compensates a corresponding distance control error which occurs over a remaining travel distance, and inputting said compensation signal to said current controller;

e. inputting distance control errors caused by stochastic interferences, after a conclusion of the starting test, to an integrating amplifier which is connected to a distance controller for completely equalizing until the end of the travel all distance control errors still remaining after performing said steps a. through d.; and

f. upon a restart after a stop outside a place of destination, temporarily increasing a corresponding residual one of said distance control errors.

4,887,696

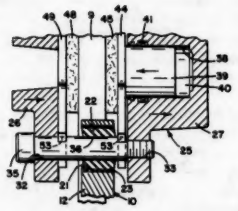
DISC BRAKE

Philip D. Redenbarger, Centerpoint, Ind., and George W. Megginson, Thomasville, Ala., assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 30, 1988, Ser. No. 277,729

Int. Cl.[4] F16D *55/02, 55/22, 65/14, 65/54*

U.S. Cl. 188—73.45 **11 Claims**



1. A disc brake assembly comprising a stationary support member having a portion thereof adjacent to a rotor to be braked, a caliper member movably disposed relative to said rotor, a pair of friction elements mounted on said caliper member for frictional engagement with said rotor during braking, a first pin member connected to said support member and operative to movably guide said caliper member relative to said rotor, a second pin member is secured to said caliper member and extending in a direction parallel to said first pin member for movement with caliper member, an elastomeric deformable ring member interconnecting said second pin member to said support member, said ring member fixedly secured to said support member, said ring member slidably and frictionally engaged to said second pin member, and at least one piston member mounted in said caliper member and operative upon actuation to move said friction elements into engagement with said rotor while deforming said ring member in an axial direction between said support member and said second pin member as said caliper member and said second pin members move relative to said support member.

4,887,697

BRAKE ACTUATOR

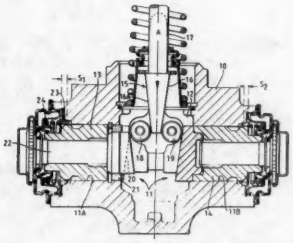
Sigmar Micke, Koblenz Metternich, Fed. Rep. of Germany, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Sep. 25, 1987, Ser. No. 100,910

Claims priority, application United Kingdom, Sep. 26, 1986, 8623225

Int. Cl.[4] F16D *65/56*

U.S. Cl. 188—79.62 **12 Claims**



1. A shoe drum brake of the leading/trailing type comprising:

a leading brake shoe and a trailing brake shoe each mounted adjacent the braking surface of a rotatable brake drum;

an actuator having leading and trailing opposed tappets respectively engaged with said leading and trailing shoes;

thrust-applying means disposed between said tappets and operable to move said tappets outwardly away from each other for actuation of said brake shoes;

restraint means acting to transmit inwardly directed forces applied to at least one of said tappets to a fixed surface; and

automatic leading and trailing adjuster devices operatively asssociated with said leading and trailing tappets, respectively, each comprising,

a pair of components relatively rotatable with respect to each other,

a threaded connection interengaging said pair of components, and

a thread clearance in said threaded connection for providing a predetermined free movement of the associated tappet without producing corresponding operation of the respective adjuster device, said thread clearance setting a predetermined maximum clearance between the respective brake shoe and said brake drum,

the thread clearance in said trailing adjuster device being less by a predetermined amount than the thread clearance in said leading adjuster device, so that upon actuation of said brake outward movement of said trailing tappet commences before outward movement of said leading tappet causing said trailing brake shoe to engage said brake drum before said leading brake shoe and maintaining said predetermined maximum clearance between said trailing brake shoe and said drum less than

said predetermined maximum clearance between said leading brake shoe and said drum.

4,887,698

BRAKE ACTUATOR

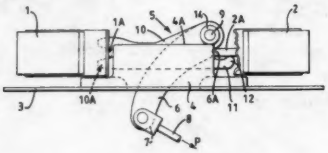
Timothy J. Hunt, Gwent, and Hadyn L. Craske, Cardiff, both of Great Britain, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Aug. 3, 1988, Ser. No. 227,873

Claims priority, application United Kingdom, Aug. 27, 1987, 8720203

Int. Cl.[4] F16D *51/22*

U.S. Cl. 188—325 **12 Claims**



1. A mechanical brake actuator for a shoe drum brake wherein a pair of shoes are movably mounted on a back plate and have adjacent ends engageable with an abutment fixed relative to the back plate, the actuator comprising:

an opening in the abutment;

a pair of spaced surfaces on the abutment on opposite sides of said opening;

a pair of actuator parts for co-action respectively with the brake shoes, one part being engageable with one brake shoe and being connectable to force applying means, and the other part being a strut engageable with the other brake shoe and being pivotally connected to said one part;

a pivot member pivotally interconnecting said actuator parts;

a pair of rollers rotatably mounted on said pivot member and in rolling engagement respectively with said spaced surfaces; and

at least one of said actuator parts having at least a part thereof movably disposed in said opening, so that actuating force applied on said one part moves the brake shoes apart towards engagement with the drum.

4,887,699

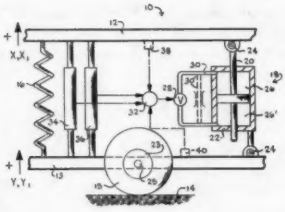
VIBRATION ATTENUATING METHOD UTILIZING CONTINUOUSLY VARIABLE SEMIACTIVE DAMPER

Douglas E. Ivers, Cary; Lane R. Miller, Fuquay-Varina, and Warren R. Schroeder, Cary, all of N.C., assignors to Lord Corporation, Erie, Pa.

Filed Feb. 10, 1989, Ser. No. 310,109

Int. Cl.[4] F16F *9/18*

U.S. Cl. 188—378 **18 Claims**



1. In the method of operating a mounting system including relatively movable supported and supporting members interconnected by a continuously variable semiactive damper switched between an on state and an off state, and a third member capable of storing energy and of abruptly releasing its stored energy upon switching of the damper from one to the other of the states thereof, the third member being in series with the damper, the improvement comprising:

delaying switching of the damper from the one of its states to the other of its states until the energy stored by the third member is no greater than a preselected low magnitude.

4,887,700

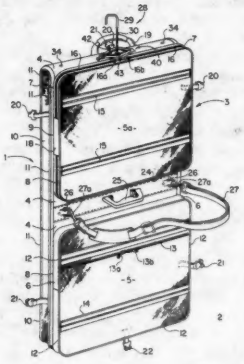
LUGGAGE TO CARRY SUITS/DRESSES

Allen C. Rice, 101 Sixth St., Vidalia, Ga. 30474

Filed Jul. 25, 1988, Ser. No. 223,357

Int. Cl.[4] A45C *13/04, 13/10, 13/22*

U.S. Cl. 190—111 **4 Claims**



1. Luggage convertible between a garment bag mode and a pullman case mode comprising an inner surface carrying two opposing opening zippers, each zipper originating at the center of an upper end of said luggage and terminating along the outer sides of said inner surface at a bottom end of said surface; an outer surface of wear-resistant fabric, said outer surface having a pair of pockets secured thereto in a spaced relationship about a central portion of said outer surface, said inner surface and said outer surface of said luggage being joined by a web extending therebetween by welted seams to form a flexible frame along sides and top and bottom of said inner and outer surfaces; each of said pockets having two pairs of spaced apart adjacent outwardly projecting soft ribs extending across the widths of said pocket; each of said pockets having an outer surface joined to said bag outer surface by a web forming pocket sides with said pocket outer surface and secured to said pocket outer surface by a welted seam to form a flexible frame for said pocket, one of said pockets having opening means extending across the width of said one pocket, the other of said pockets having two opening means in said second pocket web, said opening means having spaced apart terminals, said opening means providing access to the interior of said other pocket from either of two opposing sides; the welted seam joining said outer surface of said luggage and said related web carrying a plurality of straps and hooks to secure said luggage in said pullman case mode; said central portion of said outer surface having first means to carry said pullman mode luggage by hand and second means to carry said pullman mode luggage by a shoulder strap means; means secured to said upper end of said luggage to carry said luggage by hand in said garment bag mode; and means within said upper end of said luggage in said upper end to selectively store means to hang said luggage in said garment bag mode over a door, hook or rod, said storage means in the said upper end of said luggage comprising a zippered opening forming a pocket disclosing a rigid plate

therein extending the width of said luggage between said outer surface and a lining for said luggage and secured thereto, a U-shaped rectangularly configured hook attached at one end to a cable or chain, the chain or cable other end terminating in a ball swivellingly retained in a capped fitting having a diametral slot therethrough to permit said hook and cable or chain to be stored within said storage means, said fitting being secured by known means to said rigid plate.

4,887,701

MOTOR CONTROL-BRAKE DEVICE

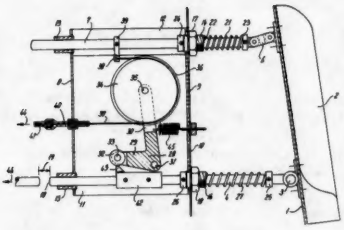
Timotheus T. Van Der Vliet, Westlijk Halfrond 307, 1183 Hz Amstelveen, Netherlands

Filed Jun. 27, 1988, Ser. No. 211,598

Claims priority, application Netherlands, Jun. 26, 1987, 8701503

Int. Cl.[4] B60K *41/20*

U.S. Cl. 192—1.56 **5 Claims**



1. Motor control brake device comprising: a brake mechanism; an engine controlling member; a plate-shaped part having an upper side and a lower side and adapted to be engaged by the foot of the driver; a plunger means engaged in the condition of use by the upper side of the plate-shaped part; a spaced plunger means engaged by the lower side of the plate-shaped part, wherein one of said plunger means is connected with the brake mechanism and the other with the engine controlling member, said plunger means connected with the brake mechanism being provided with cam means to exclude at its actuation the influence of the other plunger means of the engine controlling member; a pivoting member connected to the engine controlling member provided with a surface which engages said cam means, wherein said cam means is actuated by the plunger means connected to the brake mechanism, whereby the plunger means for the engine controlling member is made completely ineffective to control said engine controlling member.

4,887,702

BRAKE/SHIFT INTERLOCK FOR AN AUTOMATIC TRANSMISSION SHIFT CONTROL MECHANISM

Richard Ratke, Dearborn, and Donald E. Ellison, St. Clair Shores, both of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.

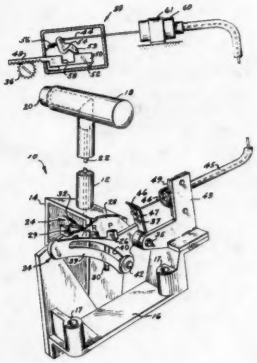
Filed Jun. 13, 1988, Ser. No. 206,255

Int. Cl.[4] B60K *41/26, 41/04;* H01F *7/08*

U.S. Cl. 192—4 A **18 Claims**

1. A brake/shift interlock for use in a vehicle having a shift control mechanism for an automatic transmission, the transmission having a Park mode and non-Park modes, the shift control mechanism having a shift lever for controlling selection of the transmission modes, a detent mechanism having a latch and latch plate, the latch being adapted to be in detented engagement with respective detent notches in the latch plate, one said detent notch coinciding with a Park position of the shift lever, and the latch being selectively, manually actuable out of said detented engagement with a respective said detent notch, and a Park/Lock member actuable to lock said latch in said Park position detent notch, the vehicle having an ignition switch having Off and Run positions, an ignition lock mechanism associated with the ignition switch and connected with said Park/Lock member for actuating said Park/Lock member to a Lock position to maintain said latch locked in said Park position detent notch when the ignition switch is in its Off position, and a brake switch connected in an electrical power circuit and adapted to be actuated in conjunction with actuation of vehicle brakes, the brake/shift interlock comprising:

an electromagnetic actuator;



means for connecting said electromagnetic actuator electrically in said power circuit including said brake switch to control operation of said actuator as a function of said actuation of said brake switch; and

means for mechanically connecting said electromagnetic actuator directly with the Park/Lock member, said electromagnetic actuator being energizable for placing said connecting means in tension and urging said Park/Lock member toward said Lock position.

4,887,703

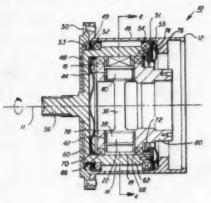
OVERRIDING CLUTCH

Eugene A. Moore, Durham, and Elmer B. Lutz, Hillsborough, both of N.C., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 24, 1988, Ser. No. 261,547

Int. Cl.[4] F16D *15/00*

U.S. Cl. 192—45 **5 Claims**



1. An overriding clutch comprising:

a support means;

an outer body having a first shaft portion with an axis and having a radially inner surface and being rotatably mounted on the support means; and

an inner body having a second shaft portion disposed coaxially with the first shaft portion and having an annular wall portion connected to the second shaft portion and being rotatably supported and having a compression member with a pair of diametrically opposite roller members and

with a pair of end bearing surfaces, for urging the respective roller member against the radially inner surface by equal and opposite radial forces, for transmitting a torque between the inner body and the outer body, wherein the compression member includes:

a center portion; and

a pair of enlarged end portions received in a respective pair of holes in the annular wall portion, and having respective radially outer sides containing the end bearing surfaces.

4,887,704

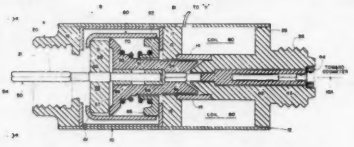
ODOMETER DISABLING SYSTEM AND CLUTCH THEREFOR

Herbert C. Glesmann, 6145 S. 102nd St., Omaha, Nebr. 68127

Filed Mar. 17, 1989, Ser. No. 324,609

Int. Cl.[4] F16D *27/10*; G01C *22/00*

U.S. Cl. 192—90 **6 Claims**



4. For use with an overland motor vehicle including a traversal-recording odometer having an odometer-coupling that is actuatably connectable with flexible-shaft means to a transmission coupling of the vehicular transmission, an electrically-disengageable spring-actuated clutch adapted for temporarily disengaging said odometer from traversal-recording, and said clutch comprising:

(a) a tubular housing having an inside-wall surrounding a directionally longitudinally extending housing-axis and having a pair of ends transversely intersecting said housing-axis including a front-end and a rear-end;

(b) securely surrounded by a medial portion of said housing, an annular divider that divides said housing into forward and rearward regions;

(c) securely retained at and relegated to the housing rearward region, a tubular rearward-member which is provided with a rear-nipple that is alternatively adaptable for connecting to an odometer-coupling and to the second-coupling of a flexible-shaft;

(d) located forwardly and rearwardly of said divider and forwardly of said rearward-member, a forwardly outwardly flared aand magnetically-permeable tubular mover surrounding said housing-axis, forward portions of the mover bore being of circular cross-sectional shape and rearward portions of the mover bore being of noncircular cross-sectional shape;

(e) extending along said housing-axis, a rear-spindle having a fore-length extending into and having a keyed relationship with the rearward portion of said tubular mover, the rear-spindle having a rear-length provided with a bore of noncircular cross-sectional shape and adaptable to receive therewithin an odometer-pin;

(f) extending along said housing-axis, a front-spindle rotatably extending into a forward portion of said tubular mover, said front-spindle at the forward extremity thereof having a noncircular cross-sectional shape for axially extending into said transmission-coupling;

(g) securely retained at said housing front-end and relegated to the housing forward region, a tubular forward-member which at the forward part thereof is provided with a front-nipple that is alternatively adaptable for connecting to said transmission-coupling and to said flexible-shaft first-coupling;

(h) surrounding a medial portion of said front-spindle and co-revolvable therewith, a friction disc having a pair of transversely extending sides including a front-side and also a rear-side adapted to abut the forwardly flared portion of said mover;

(i) located between said forward-member and said divider, a pressure cup surrounding said friction disc and including a cup frontal should adapted to abut the friction disc front-side, said cup also having an annular rear-length;

(j) securely retained at the pressure cup rear-length and relegated forwardly of said divider, a saddle revolvably surrounding said tubular mover;

(k) spring means tending to urge the tubular mover away from said retained saddle and against the friction disc rear-side and also tending to urge the friction disc front-side against the pressure cup frontal shoulder, and thereby tending to provide a spring-actuated clutch condition appropriate for odometer traversal recording; and

(l) located rearwardly of said divider and surrounding the rearward portion of said tubular mover, an electrically powerable coil and which upon the feeding of electrical current thereinto attracts the tubular mover away from the friction disc, and thereby providing an electrically-disengaged clutch condition that disables the odometer from traversal-recording.

4,887,705

AUTOMATIC LENGTH ADJUSTER FOR CONTROL CABLES, AND CONTROL CABLE PROVIDED THEREWITH

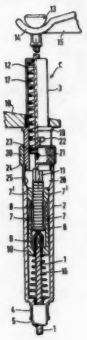
Victorino S. Solano, and Antonio S. Trilla, both of Barcelona, Spain, assignors to Pujol Y Tarrago, S. A., Barcelona, Spain

Filed Sep. 30, 1988, Ser. No. 252,439

Claims priority, application Spain, Oct. 9, 1987, 8702893

Int. Cl.[4] F16D *13/75, 65/38*

U.S. Cl. 192—111 A **9 Claims**



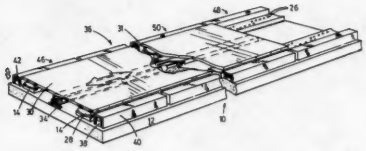
1. A length adjuster for automatically adjusting an effective length of a control cable including a primary cable part and a secondary cable part, with changes in a position of a member controlled by the control cable, the length adjuster comprising an elongate hollow body including two ends and provided with an opening in one of said ends for passing the primary cable part and an opening in another of said ends for passing the secondary cable part; interconnecting means located in said elongate hollow body and interconnecting the primary and secondary cable parts to allow a control force applied to the primary cable part to be transmitted through the secondary cable part to the cable-controlled member; a compensation spring acting on said interconnecting means to automatically vary a position of an interconnection of the primary and secondary cable parts with respective changes in the position of the member; and releasable means slidable over said elongate hollow body for retaining said compensation spring in a condition in which the control cable has a maximum extent to facilitate assembly.

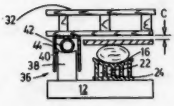
4,887,706

ACCUMULATION AND STORAGE SYSTEM FOR PALLETIZED LOADS

Herbert E. Gladish, Ottawa; Ronald C. Hallett, Pickering, and Richard C. Blair, Stouffville, all of Canada, assignors to Eddy Forest Products, Ltd., Ottawa, Canada

Filed Mar. 15, 1988, Ser. No. 168,152
Claims priority, application Canada, Mar. 3, 1987, 533268
Int. Cl.[4] B65G *25/04*
U.S. Cl. 198—774 2 Claims





1. A system for transferring palletized loads from a first accumulation system to a second accumulation system, each of said accumulation systems including:

(a) elongated deck support means;

(b) elongated deck means including means coacting with said support means to support and guide said deck means for reciprocal movement relative thereto;

(c) drive means connected to said deck means for reciprocally moving said deck means between first and second positions; and

(d) pallet moving means including an elongated pallet support member extending alongside each edge of said deck means and projecting thereabove, a plurality of tube support members extending transversely on said deck means and spaced apart therealong, inflatable tube means on each of said tube support members, a downwardly open elongated lifting member covering each said tube means and tube support member, and pressurizing means for selectively inflating said tube means to lift said lifting members into lifting engagement with pallets resting on said pallet support members for movement with said deck means as said deck means moves from said first position to said second position or for selectively deflating said tube means for lowering any pallets previously lifted by said pallet moving means to rest on said pallet support means to permit said deck means to move from said second position to said first position below such lowered pallets;

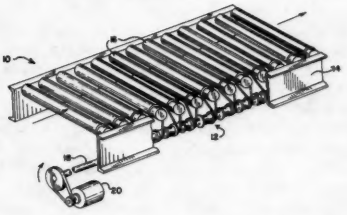
said transferring system comprising: an opening in one pallet support member of said second accumulation system, said first accumulation system being at right angles to said second system at said opening; and deck support means carried by the deck means of said second system between a pair of the tube support members thereof and alignable with the deck support means of said first system at said opening; said first system deck means at the second position thereof overlying said second system deck means at the first position thereof.

4,887,707

INTERLOCKING TORQUE TUBE-PULLEY ASSEMBLY FOR LIVE ROLLER LINE SHAFT CONVEYORS

Jeffrey Harms, Spring Lake, Mich., assignor to Ermanco Incorporated, Spring Lake, Mich.

Filed Jun. 13, 1988, Ser. No. 206,087
Int. Cl.[4] B65G *13/06*
U.S. Cl. 198—781 36 Claims



1. A live roller, line shaft conveyor system, comprising:

a series of two or more conveyor rollers, each of said rollers extending between and axially connected to each of a pair of parallel frame members, each said conveyor roller including a recessed portion for receiving an endless drive belt;

a drive shaft extending transversely beneath said conveyor rollers;

at least one interlocked assembly, said assembly including at least one pulley member axially disposed along said drive shaft, said pulley member having a pair of flanges, each said flange having recessed portions therein, and at least one tubular spacer member, said one spacer member being releasably held within said recessed portions in one of said flanges in a snap/lock arrangement;

a plurality of endless drive belts, each said belt looped around one of said pulley members and one of said conveyor rollers and within said recessed portion of said conveyor roller; and

whereby said drive belts maintain said interlocked assembly in frictional contact with said drive shaft for transmitting power from said drive shaft to each of said conveyor rollers when said drive shaft is rotating.

4,887,708

DRIVE APPARATUS FOR BELT POWER TURNS

Robert D. Brown, Canon City, and Richard A. Compton, Pueblo, both of Colo., assignors to Portec, Inc., Oak Brook, Ill.

Filed Jan. 23, 1989, Ser. No. 300,135
Int. Cl.[4] B65G *15/02*
U.S. Cl. 198—831 20 Claims

1. Apparatus for driving an endless conveyor belt for a power turn comprising:

a frame having carved outer and inner side walls;

support means for holding said outer and inner side walls in spaced apart relationship;

a movable endless conveyor belt having outer and inner peripheral edges and wherein said outer peripheral edge has a radius greater than the radius of said inner peripheral edge;

a movable endless chain secured to an outer portion of said endless conveyor belt and extending outwardly therefrom over said outer peripheral edge;

guide means for guiding the movement of said endless chain;

said frame having a first end portion and a second end portion;

a plurality of rolls rotatably mounted on a shaft at each of said end portions and said rolls having cylindrical outer surfaces having a diameter less than about one inch;

each of said plurality of rolls having an axis of rotation which is generally parallel to the horizontal;

a rotatable drive shaft mounted on said outer and inner side walls adjacent to each of said end portions;

drive means for rotating at least one of said drive shafts;

a drive roll mounted on each of said drive shafts for rotation therewith;

each of said drive rolls having a tapered outer surface with the largest diameter thereof closer to said outer side wall;

a drive sprocket mounted on each of said drive shafts for rotation therewith;

each of said drive sprockets having a plurality of teeth projecting outwardly from the peripheral outer surface thereof for engagement with said endless chain;

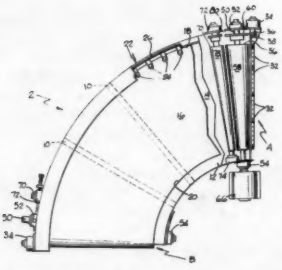
each of said drive shafts being located below and arcuately inwardly from one of said plurality of rolls;

a snub roll shaft mounted on said frame at locations above and arcuately inwardly from each of said drive shafts;

a snub roll is provided for each of said snub roll shafts for rotation therewith;

each of said snub rolls having a tapered outer surface with the largest diameter thereof closer to said outer side wall;

a sprocket mounted on each of the snub roll shafts for rotation therewith;



each of said sprockets having a plurality of teeth projecting outwardly from the peripheral outer surface thereof and located to be engaged by said endless chain to rotate said snub roll shaft;

an idler sprocket rotatably mounted on said outer side wall adjacent each of said end portions;

each of said idler sprockets having an axis of rotation that is parallel to said axis of rotation of said plurality of rolls;

each of said idler sprockets having a plurality of teeth projecting outwardly from the peripheral outer surface thereof and located to be engaged by said endless chain so as to guide the movement of said movable endless chain;

said movable endless conveyor belt being mounted so that during the movement thereof portions thereof will contact portions of the outer surface of said plurality of rolls; portions of the lower half of said drive rolls and portions of the upper half portion of said snub rolls; and

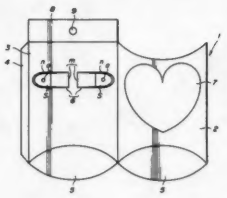
said movable endless chain being mounted so that during the movement thereof portions thereof will contact portions of said idler sprockets; portions of the lower half of said drive sprockets and portions of the upper half of said snub roll sprockets.

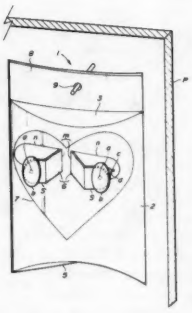
4,887,709

PACKAGE CONTAINER FOR A PAIR OF ORNAMENTS

Takazumi Shimamine, 152-2, Takenomaru Naka-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Sep. 28, 1988, Ser. No. 250,178
Claims priority, application Japan, Oct. 1, 1987, 62-150934
Int. Cl.[4] B65D *5/50*
U.S. Cl. 206—45.14 **2 Claims**





1. A package for housing and displaying a pair of jewelry pieces comprising: a box-like package container having an inner space large enough to house the jewelry pieces, said box-like package having an inner rear wall including a pair of flaps for holding the jewelry pieces horizontally in spaced apart relationship and a front wall having a window opening, said rear wall having a hole at its top for permitting the hanging of the package.

4,887,710

RETAINER FOR SURGICAL SUTURES

Constance E. Roshdy, North Brunswick, N.J.; Robert J. Cerwin, Pipersville, Pa., and Marvin Alpern, Glen Ridge, N.J., assignors to Ethicon, Inc., Somerville, N.J.

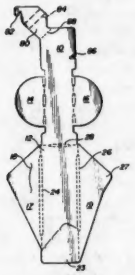
Division of Ser. No. 264,292, Oct. 28, 1988. This application May 3, 1989, Ser. No. 346,421
Int. Cl.[4] A61L *15/00*
U.S. Cl. 206—63.3 **12 Claims**

1. An improved retainer for surgical suture which encloses a surgical suture, comprising:

a suture winding panel having a pair of longitudinal edges and a pair of transverse edges;

a suture enclosing panel having a pair of longitudinal edges and a pair of transverse edges, a transverse edge of said

suture enclosing panel being foldably connected to a transverse edge of said suture winding panel; and



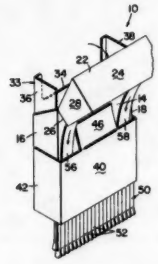
a needle park panel foldably connected to the transverse edge of said suture winding panel opposite that of said suture enclosing panel.

4,887,711

CIGARETTE AND MATCHES CONTAINER

Detlev V. Bladt, 1274 Tam O'Shanter, Azusa, Calif. 91702

Filed May 10, 1989, Ser. No. 350,613
Int. Cl.[4] A24F *15/00, 27/20, 27/00*; B65D *77/24*
U.S. Cl. 206—92 **17 Claims**



1. A cigarette and match container comprising:

front, rear, bottom and side walls cooperating to define a box,

a lid hinged to an upper portion of the rear wall for movement between an open and a closed position wherein it engages the upper edges of said rear, front and side walls,

panel means mounted on the box in parallel confronting relation with the rear wall and cooperating therewith to define a channel having a lower opening,

a match set disposed in said channel and comprising a base and a plurality of individual matches extending therefrom and having stems and heads, and

at least one pull strip slidable relative to the box rear wall, the strip being connected at its upper end portion to the lid and at its lower end portion to the match set base,

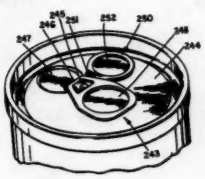
whereby upon movement of the lid from its closed position to its open position the at least one pull strip is moved relative to the box rear wall and the channel to move the match set downwardly to extend portions of the matches outwardly from said channel opening for manual grasping by a user.

4,887,712

RECLOSABLE SELF-OPENING CAN END

Robert A. Wells, 107 N. Lakeside Dr., Kennesaw, Ga. 30144

Division of Ser. No. 207,141, Jun. 15, 1988. This application Apr. 14, 1989, Ser. No. 339,085
Int. Cl.[4] B65D *41/32*
U.S. Cl. 206—269 **4 Claims**



1. Selectably reclosable easy opening apparatus for a container, comprising:

a container wall;

a panel defined in said wall at least in part by a selectably separable region;

an opening member attached to said wall and selectably movable to apply force separating said separable region and displacing said panel, thereby defining an opening in said wall; and

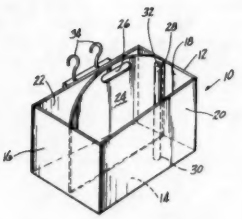
reclosure means separate from said opening member and attached to said wall for selective movement into registry with said opening, so that the opening can be selectably reclosed.

4,887,713

WINDOW WASHER CADDY

Donna D. Tupper, 74 Tuck Rd., Manchester, Conn. 06040

Filed Aug. 29, 1988, Ser. No. 237,549
Int. Cl.[4] B65D *69/00*
U.S. Cl. 206—225 **5 Claims**



1. A window washer caddy comprising a box including a bottom providing an internal floor, opposed ends and opposed sides and an open top, a partition having a carrying aperture and dividing said box into first and second portions, a spindle having a lower end secured to said floor at a location within said first portion and projecting upwardly from said floor to an upper free end for receiving thereon and holding a roll of paper towels, said first portion also adapted to receive therein a conventional bottle of window washing liquid, and said second portion being adapted to receive used paper towels, and a pair of spaced hooks for releasably hanging said caddy from a rung of a ladder, wherein said bottom is rectangular, said opposed ends are rectangular and said sides are rectangular and the edges of said ends and said sides remote from said bottom define a plane parallel to said bottom, and said partition extends between said ends and is parallel to said sides and has a smoothly curved upper edge with ends in said plane and a

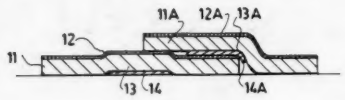
central portion above said plane and said carrying aperture is above said plane.

4,887,714

PRE-PACKAGED PRESSURE SENSITIVE TEAR TAPE

Lawrence J. O'Connor, Winnipeg, Canada, assignor to KT Technologies Inc., Bridgetown, Barbados

Filed Jan. 11, 1988, Ser. No. 141,957
Int. Cl.[4] B65D *85/66*
U.S. Cl. 206—411 **12 Claims**



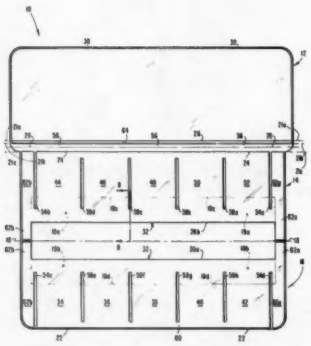
1. A package of tear tape comprising a tape in the form of a elongate thin supporting substrate consisting of only one single layer of a film material having a strength, width and thickness adapted for use of the tape as a tear tape in propagating a tear line in a packaging material, and a layer of adhesive on one surface of the substrate, said tape being wound into a long length package which is circular cylindrical in shape having an axial length greater than the width of the tape with the tape traversing axially of the cylindrical package as it winds around the cylindrical package, wherein said layer of adhesive on said one surface of the substrate comprises a layer of a pressure sensitive adhesive which lies along the substrate longitudinally of the substrate in a width less than the width of the substrate at a position intermediate the width of the substrate with each side edge of the adhesive layer spaced from that one of the side edges of the substrate which lies adjacent to the side edge of the adhesive by a distance such that spreading movement of the adhesive layer under pressure in the wound package does not cause the adhesive to reach the edges of the substrate.

4,887,715

SURGICAL GAUZE SPONGE MANAGER

James G. Spahn, Indianapolis; Steven P. Langley, and Michael L. Jacobs, both of Martinsville, all of Ind., assignors to Ehob, Inc., Mooresville, Ind.

Filed Apr. 3, 1989, Ser. No. 332,769
Int. Cl.[4] B65D *85/00*; A61B *19/00*
U.S. Cl. 206—370 **6 Claims**



1. A surgical gauze sponge manager to receive a predetermined number of discarded sponges and to contain bodily fluids absorbed thereby, comprising:

a first set of dimensionally controlled pockets, including a plurality of individual pockets each sized to receive one standard surgical gauze sponge that are positioned and interconnected together in a side-by-side relationship with each of said pockets being in fluid communication with a common bottom reservoir for collecting bodily fluids;

a second set of dimensionally controlled pockets in mirror image relationship to said first set of pockets, and extending from an edge area adjacent the openings of said first set of pockets, and including a plurality of individual pockets positioned and interconnected together in a side-by-side relationship with each of said pockets being in fluid communication with a second common bottom reservoir for collecting bodily fluids;

side reservoirs positioned and interconnected in a side-by-side relationship with the outermost pockets of said first and said second sets of pockets to collect bodily fluids overflowing said outermost pockets;

a containment pocket extending outwardly from a second edge area adjacent said second common bottom reservoir, the opening of said containment pocket also being adjacent said second edge area, and including an inner chamber sized to fully receive said first and second sets of pockets and said side reservoirs overlayed one upon the other to form a vertical stack; and

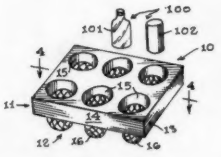
connecting means interconnecting said first and second sets of pockets and said containment pocket, including interconnecting said second and said first set of pockets together, and interconnecting said containment pocket and said second set of pockets together.

4,887,716

FLOATING BEVERAGE CARRIER WITH COLLAPSIBLE PORTIONS

Tim Abraham, 700 E. Union Ct., Broken Arrow, Okla. 74011

Filed Jun. 7, 1989, Ser. No. 362,560
Int. Cl.[4] B65D *75/00*
U.S. Cl. 206—427 **4 Claims**



1. A floating beverage carrier apparatus for beverage containers including bottles and cans wherein the apparatus comprises:

a flotation unit including a flotation member provided with a plurality of apertures dimensioned to receive beverage containers; and,

a plurality of collapsible beverage container receptacles wherein each beverage container receptacle is operatively associated with one of the plurality of apertures in said flotation member.

4,887,717

PACKAGING WITH A GAUGE OR TOOL FORMED FROM THE PACKAGE

John C. Secrest, Jr., Manchester, Mo., assignor to Secrest Engineered Products, Inc., Fenton, Mo.

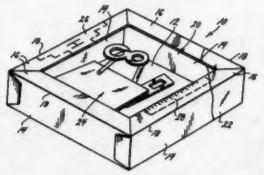
Filed Jul. 3, 1989, Ser. No. 375,396
Int. Cl.[4] B65D *69/00*
U.S. Cl. 206—575 **22 Claims**

1. A container adapted to hold a plurality of component parts of an assembly and to be used in assembling the component parts of the assembly, the container comprising:

a bottom panel;

side wall means surrounding the bottom panel and together

with the bottom panel defining a tray having an interior volume that is accessible from its top and is adapted to hold a plurality of component parts of an assembly; and



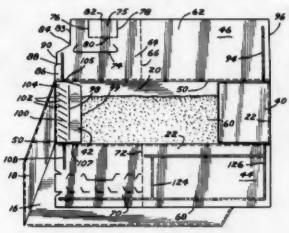
a measuring gauge formed integrally in one of the bottom panel and side wall means of the tray, the gauge being adapted to be removed from the bottom panel or side wall means to enable use of the gauge in connection with component parts held by the tray.

4,887,718

CARTON END CLOSURE

David S. Anderson, Brooklyn Park, and Michael E. Geddis, Plymouth, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Dec. 27, 1988, Ser. No. 290,055
Int. Cl.[4] B65D *5/70*
U.S. Cl. 206—611 **7 Claims**



1. In a carton end closure for a rectangular carton body comprising a first major panel **20**, a second panel **16**, a first side panel **14**, a second side panel **18** and a closed bottom and fabricated from a carton blank **10** for containing a powdered or granular material **60**, wherein an improvement provides sift proof sealing without an inner liner and comprises:

A. a first major side flap **40** hingedly connected to the first side panel **14** inwardly folded;

B. a second rectangular minor side flap **42** hingedly connected at a first end to the second side panel **18** inwardly folded, said second minor flap **42** having,

an opposed major free edge **99** at its second end,

an opposed pair of minor free edges **105** and **107** perpendicular to the major free edge,

a topical exterior coating capable of delamination,

a transverse score line **98** through the topical exterior coating intermediate the first and second ends, and

at least one score line **102** running from the first end to the transverse score line **98**;

C. a first rectangular major end flap **46** overlaying the first and second minor side flaps hingedly connected at a first end to the first major panel **20**, said major end flap having

a longitudinally extending major free edge **82** at its second end,

first and second spaced apart parallel minor free edges **83** and **96** perpendicular to the major free edge,

exterior and interior major surfaces,

a transverse perforation line **66** intermediate and parallel to the first and second minor edges thereby defining a spout flap portion **64** and a fixed portion **62**, said spout flap portion **64** having an inverted "C" style tuck tab slit cut **74**,

said spout flap portion **64** having a notch **84** on the first minor free edge and having

a finger hole **75** on its major free edge positioned equidistantly between the notch **84** and the transverse perforation line **66**,

a first transverse adhesive means **94** for removably adhering the first major end flap to the underlying first minor side flap, and a second transverse adhesive means **88** for removably adhering the first major end flap to the underlying second minor side flap; and

D. a second rectangular major end flap **44** inwardly folded overlaying the first major end flap **46** hingedly connected at a first end to the second major panel **16**, said second major end flap having

an opposed, longitudinally extending major free edge **114** at its second end,

first and second spaced apart parallel minor free edges **110** and **128** perpendicular to the major free edge

exterior and interior major surfaces, and

a transverse perforation line **72** intermediate and parallel to the first and second minor free edges and overlaying the transverse perforation line **66** of the first major end flap defining a spout flap portion **70** and a fixed portion **68**,

a longitudinally extending pull tab **138** defined by a plurality of pull tab perforations **116** commencing at the first minor free edge **110** and extending to the transverse perforation line **72** and wherein the pull tab perforations **116** include a plurality of tuck tab defining perforations **118**,

a first transverse adhesive means **108** for removably adhering the second major end flap **44** to the underlying second minor side flap **42** on the spout flap portion proximate the first minor free edge **110** and extending from the pull tab perforation to the first end,

a second transverse adhesive means **124** extending on the fixed portion **68** proximate the transverse perforation line **72**,

a third transverse adhesive means **126** on the fixed portion **68** proximate the second minor free edge **128**, and

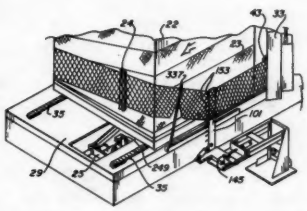
first and second parallel spaced apart longitudinally extending adhesive means **120** and **122** for removably adhering the second major end flap **44** to the underlying major end flap **46**.

4,887,719

MATERIAL ENGAGING AND SECURING DEVICE

Milton W. Kapke, Golden, Colo., assignor to Goldco Industries, Inc., Loveland, Colo.

Division of Ser. No. 943,741, Dec. 19, 1986, Pat. No. 4,747,252.
This application May 13, 1988, Ser. No. 194,426
Int. Cl.[4] B65D *19/00*
U.S. Cl. 206—597 **18 Claims**



1. A material engaging and securing device for securing material wrapped around a structure, device comprising a

plurality of interconnected engaging means positionable adjacent to said structure, with at least some of said engaging means extending away from said structure and with said engaging means including place maintaining means to secure the position of said material engaging and securing device relative to a position adjacent to said structure, whereby said material is engaged by said at least some of said engaging, means and secured around said structure.

4,887,720

PACKAGE FOR LIQUID MATERIALS

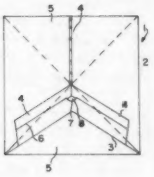
Jurgen Farber, Am Hageldreuz, Fed. Rep. of Germany, assignor to PKL Verpackungssysteme GmbH, Dusseldorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 307,254, Sep. 30, 1981. This application Sep. 6, 1985, Ser. No. 773,391

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1980, 3037072

Int. Cl.[4] B65D *5/72*

U.S. Cl. 206—621.2 3 Claims



1. A plastic-coated cardboard blank for forming a container of rectangular cross-section having a gabled top, the blank comprising four walls, a first pair of opposite walls each having fold lines forming an upwardly convergent triangle having its apex some distance below the top of its respective wall, the second pair of opposite walls being adapted to be joined to one another at their tops to form the gable, one of the first pair of walls having a cut-out at its top above its respective apex and only in its immediate vicinity, the cut-out being of the approximate area of the cross-section of a straw, whereby upon erecting the blank and joining the tops of the second pair of walls the resulting gable closes off the cut-out but upon opening the gable without tearing of the wall the cut-out is uncovered for insertion of a straw therethrough into the interior of the container.

4,887,721

LASER PARTICLE SORTER

John C. Martin, and Tudor N. Buican, both of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 30, 1987, Ser. No. 126,156

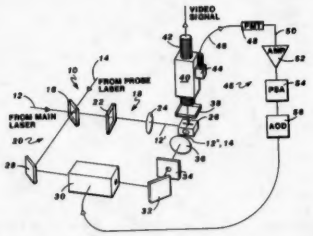
Int. Cl.[4] B07C *5/342*

U.S. Cl. 209—579 12 Claims

7. A method for sorting selected particles from a variety of particles in a flow stream, comprising the steps of:

radiatively propelling said variety of particles along a propulsion path;

irradiating said particles with a probe laser beam to derive an output signal functionally related to a preselected characteristic in ones of said variety of particles; and



radiatively deflecting said particles with said preselected characteristic along a deflection path intersecting said propulsion path.

4,887,722

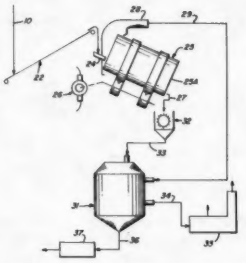
METHOD FOR BENEFICIATING BY CARBONACEOUS REFUSE

Edward H. Greenward, Sr., 92 Nancy La., McMurray, Pa. 15317

Filed Dec. 11, 1987, Ser. No. 131,820

Int. Cl.[4] B03B *1/02;* B04C *7/00;* B07B *9/00*

U.S. Cl. 209—3 9 Claims



1. A method for beneficiating carbonaceous particles from a feed stream comprising an agglomeration of carbonaceous particles, clay particles and water, said method including the steps of:

heating said feed stream comprised of said agglomeration of particles sufficient to volatilize the water from the feedstream, including the agglomeration of particles, and simultaneously agitating the feedstream in an amount sufficient to deagglomerate the heated agglomeration of particles to form discrete particles consisting essentially of carbonaceous particles with a particle size of generally plus two microns and clay particles with a particle size of generally minus two microns;

separating the heated deagglomerated feed stream, including said discrete particles, into a plurality of granular particle fractions have different size classifications, said fractions including a generally plus two micron carbonaceous particle fraction and a generally minus two micron clay particle fraction;

recovering said generally plus two micron carbonaceous particle fraction; and

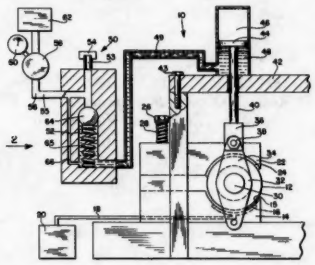
recovering said generally minus two micron clay particle fraction.

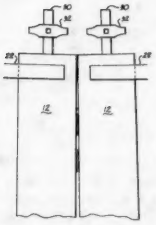
4,887,723

ANTI-FRICTION SORTING ROLL AND STABILIZER

John R. Bost, P.O. Box 902, Laurens, S.C. 29671

Filed Mar. 17, 1987, Ser. No. 27,002
Int. Cl.[4] B07C 5/06; F16C 32/06
U.S. Cl. 209—670 16 Claims





1. An apparatus for sorting round bearings according to their diameters, comprising:

(a) a pair of elongated sorting cylinders, each of which is supported on a support shaft;

(b) self-aligning bearings for supporting said support shafts for rotation about diverging longitudinal axes; and

(c) pressurized fluid stabilizer means for resiliently supporting said self-aligning bearings for controlling vertical movement of said bearings, said pressurized fluid stabilizer means permitting said bearings to move upwardly at a rate which is greater than said bearings are permitted to move downwardly.

4,887,724

TIERED TRAY ASSEMBLY

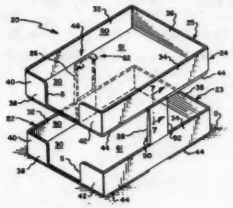
Craig A. Pielechowski, Holland, N.Y., and James S. Panzarella, North Kingston, R.I., assignors to Smith Metal Arts Co., Inc., Buffalo, N.Y.

Filed Aug. 25, 1988, Ser. No. 236,456
Int. Cl.[4] A47F 5/00
U.S. Cl. 211—11 5 Claims

1. A tiered desktop tray assembly having lower and upper trays, each of the trays having a bottom and laterally spaced apart sidewalls, and a pair of generally vertically extending laterally spaced apart spacer brackets disposed adjacent the laterally spaced apart sidewalls for supporting the upper tray above the lower tray;

characterized by the laterally spaced apart sidewalls of the lower tray being formed of a resilient material, and by a lower end portion of each of the spacer brackets being disposed within the lower tray with an upper part of the lower end portion contacting an upper inner surface of the adjacent resilient sidewall with the lower end of the lower end portion being held from movement away from the adjacent

sidewall, the parts being designed so that when the spacer brackets are assembled to the upper and lower trays upper



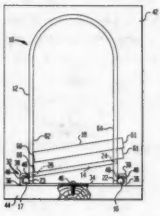
end parts of the spacer brackets are biased into firm engagement with the upper tray by the resilient sidewalls to cause the upper tray to be effectively held between the spacer brackets.

4,887,725

STORAGE RACK ASSEMBLY

Andrew J. VanNoord, Grand Rapids, Mich., assignor to Kent Design & Mfg., Inc., Grand Rapids, Mich.

Filed Oct. 21, 1987, Ser. No. 111,442
Int. Cl.[4] A47G 19/08
U.S. Cl. 21—41 16 Claims



1. A storage rack assembly for storing articles such as cassettes, disc containers and records on shelves, in cabinets and the like, said storage rack assembly comprising:

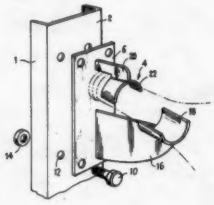
a rack comprising a rack means and article support means, said rack means comprising a base and at least one pair of side retainer means, said base including elongated wires, and each of said side retainer means comprising U-shaped wires having legs, end portions of which are mounted to said base, said side retainer means being substantially perpendicular to said base and spaced apart a distance to conform substantially to the width of an article of predetermined size, said rack having an open front to permit said article to pass therethrough but in close proximity to said side retainer means, and said article support means being mounted to said rack means to provide support for said article when said article is positioned between said one pair of said side retainer means; and

elongated track means comprising mounting means for slidably mounting said rack to said track means for movement generally parallel to said open front and generally perpendicular to said side retainer means whereby said rack can be moved along said track to present the open front of said rack for access to said article; wherein

said article support means comprises wire elements mounted to said legs and forming a bight portion of said U-shaped wires to support said article when said elongated track

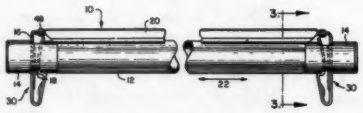
means is mounted to an underside of a support and said rack is suspended from said elongated track means.

4,887,726
BOTTLE STAND
Ivan Cizaire, Chemin du Mourion Haut, 30400 Villeneuve les Avignon, France
Filed Feb. 1, 1989, Ser. No. 304,605
Claims priority, application France, Feb. 5, 1988, 88 01387
Int. Cl.[4] A47B *73/00*
U.S. Cl. 211—74 **12 Claims**



1. Bottle stand comprising at least one rigid elongated section member having a longitudinal plane and at least one holding device for holding a neck of a bottle and mounted on said at least one section member, said holding device comprising a rear support and a front support facing in opposite directions, offset in height and spaced apart a distance less than the length of a normal glass bottle neck, at least one of said supports being constituted by a curved member, and a fixing element for fixing to the section member, said at least one support being connected to said fixing element and being laterally and downwardly inclined relative to said plane of the section member so that the neck of the bottle extends upwardly.

4,887,727
GARMENT HANGER CADDY
Richard H. Simmerman, Palatine, and Gregg E. Wiederer, Wheeling, both of Ill., assignors to Hanger-Tight Company, Wheeling, Ill.
Filed Sep. 16, 1988, Ser. No. 245,764
Int. Cl.[4] A47F *5/00*
U.S. Cl. 211—124 **20 Claims**



1. In a garment hanger caddy of the type comprising a stiff tubular member and a relatively stiff retainer strip substantially co-extensive with the tubular member, the improvement comprising:

a pair of latching members, each secured to a respective end of the retainer strip and passing through a respective pair of openings in the tubular member to secure the retainer strip in first and second positions with respect to the tubular member, each of said latching members comprising:

a first section which defines an end portion and a latch step configured to engage the tubular member adjacent at least one of the openings to limit travel of the latching member;

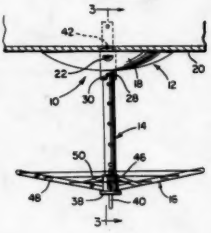
a second section which extends through the respective pair of openings;

means for securing a first end of the second section to the end portion of the first section such that the first section is biased away from the second section;

means for securing a second end of the second section to the retainer strip; and

means, positioned on a portion of the second section intermediate the first and second ends, for stiffening the second section against bending away from the first section, said stiffening means positioned centrally on the second section and spaced away from the first end of the second section such that the second section is stiffer at a central portion thereof than at the first end.

4,887,728
ADJUSTABLE CLOTHES DRYING UNIT
Francis L. DeRosia, P.O. box 1289, Evanston, Wyo. 82931-1289
Filed Jun. 7, 1988, Ser. No. 203,090
Int. Cl.[4] A47B *47/00*
U.S. Cl. 211—208 **7 Claims**



1. An adjustable clothes drying unit comprising a support tube mountable on an overhead structure, said support tube defining a vertical passage therethrough, said passage having upper and lower end portions, an elongated post slidably received through and beyond the upper and lower end portions of said passage for vertical adjustment therein, said post having upper and lower end portions, a drying rack mounted on the lower end portion of said post, upper and lower post positioning means on said post, retaining means on the upper and lower end portions of said support tube selectively engageable with said post positioning means upon a vertical adjustment of said post for fixing the post, and the drying rack therewith, in a vertically adjusted position, and means for longitudinally adjusting the position of the upper and lower post positioning means on said post for varying the vertical orientation of said post upon engagement of either positioning means with a corresponding retaining means.

4,887,729
CUP FOR HANDICAPPED PERSONS
John W. Junkman, 1000 W. 1st St., Hastings, Minn. 55033, and Florence F. Junkman, Herbster, Wis. 54844
Filed Aug. 1, 1988, Ser. No. 226,439
Int. Cl.[4] A47G *19/22*
U.S. Cl. 215—100 A **6 Claims**

1. A receptacle comprising, in combination: a cup-shaped member including a bottom wall and an upstanding side wall forming a recess, a pair of handle members issuing laterally in

generally opposite directions from said side wall, said handle members being generally U-shaped, the U-shaped handle members each having first and second leg portions and bight portions, said handle members being of a size and inclined with the first leg portion thereof of each handle member nearer to said bottom wall than the second leg portion permitting the upward insertion of one or more fingers through the handle members, and a pair of thumb rest members also issuing laterally from generally opposite positions from said side wall, said thumb rest members being oriented relative to said handle members so as to be engagable by a person's thumbs when other fingers of the person's hands are engaging the handle members, said thumb rest members located at an elevation on the side wall above said first leg portion of said handle members and spaced laterally between said first and second leg portions.

4,887,730

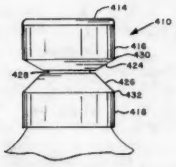
FRESHNESS AND TAMPER MONITORING CLOSURE

William Touzani, 1912 Bridgecreek Dr., Sacramento, Calif. 95833

Continuation of Ser. No. 31,513, Mar. 27, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 217,474

Int. Cl.[4] B65D *41/04*

U.S. Cl. 215—271 **17 Claims**



6. A freshness and tampering indicator forming a portion of a closure and container having an outside wall and comprising,

a circumferential pair of opposed conical sidewalls in the outside wall forming a bellow in the relaxed state, said conical sidewalls extending to at least one fold ring spaced from the outside wall and said conical sidewalls joined to the outside wall by fold rings,

one of said conical sidewalls flexing from the relaxed to the compressed state to provide an overcentering of the bellow thereby providing a latching of the bellow, said latching of the bellow retained only when the fluid pressure inside the container and closure differs a prescribed amount from the outside fluid pressure.

4,887,731

SHIPPING CONTAINER

Bruce Pett, Fenelon Falls, and David Wain, Cavan, both of Canada, assignors to Bonar Plastics Ltd., Lindsay, Canada

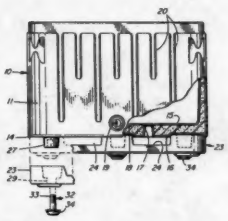
Filed Dec. 2, 1988, Ser. No. 278,747

Claims priority, application Canada, Dec. 8, 1987, 553740

Int. Cl.[4] B65D *7/00*

U.S. Cl. 220—1.5 **16 Claims**

1. A transport container comprising: a flat base bounded by four walls of uniform height, said base having a plurality of elongate feet detachably secured to the underside thereof one such foot being positioned adjacent and parallel to each of a pair of opposite side edges of the base, each said foot defining a pair of spaced elongate pocket openings adapted to receive tines of container-handling equipment, said feet being secured to the base by fastener means comprising a screw-threaded stem insertable through an aperture in said foot and engagable in a screw-threaded bore in said base, said fastener means having an enlarged flattened head adapted for engaging against



the underside of a said foot and forming a pad for the support of the container.

4,887,732

EASY-OPEN LID IN WHICH SCORE CUT EDGE CAN BE COVERED AND PROCESS FOR PREPARATION THEREOF

Hiroshi Matsubayashi, Kamakura; Masanori Aizawa, Yokohama; Michio Watanabe, Yokohama; Takashi Shimizu, Yokohama, and Tamotsu Ikegami, Yokohama, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

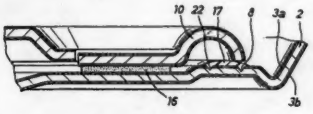
PCT No. PCT/JP87/00382, § 371 Date Apr. 11, 1988, § 102(e) Date Apr. 11, 1988, PCT Pub. No. WO87/07581, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 12, 1987, Ser. No. 188,793

Claims priority, application Japan, Jun. 13, 1986, 61-136309; Jun. 13, 1986, 61-136310; Jun. 13, 1986, 61-136311; Dec. 9, 1986, 61-291515; May 29, 1987, 62-131399

Int. Cl.[4] A47G *19/22;* B21D *51/44;* B32B *3/02*

U.S. Cl. 220—90.6 **21 Claims**



1. An easy-open lid having an opening score defining a portion to be opened, an opening tab arranged on the portion to be opened and a covering strip of a protecting resin formed to stride over the opening score beyond both the sides thereof, wherein an organic resin coating is formed on the outer surface of the lid, the covering resin strip is formed of a plastisol of a vinyl chloride resin containing at least one additive selected from the group consisting of anchoring fillers, tackifiers and amino resins and the organic resin coating is peelably bonded to the covering resin strip.

4,887,733

PRESSURE-RELEASE FUEL CAP

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Continuation-in-part of Ser. No. 129,416, Nov. 25, 1987, Pat. No. 4,765,505, which is a continuation of Ser. No. 42,791, Apr. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 888,575, Jul. 22, 1986, Pat. No. 4,676,390. This application Oct. 11, 1988, Ser. No. 256,182

Int. Cl.[4] B65D *51/16*

U.S. Cl. 220—203 **40 Claims**

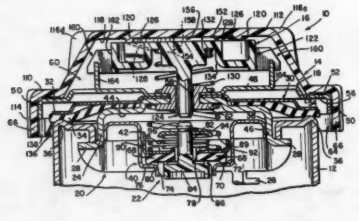
1. A fuel cap for use in a fuel system filler neck having a mouth, the cap comprising

means for engaging the filler neck, the engaging means

providing a filler neck venting passageway open to the atmosphere,

means for normally closing the filler neck venting passageway,

means for selectively actuating the closing means to open the filler neck venting passageway, and



means for selectively rotating the engaging means relative to the filler neck in at least a cap-removal direction, the rotating means including means for moving the actuating means against the closing means so that the closing means is moved from a passageway-closing position to a passageway-opening position upon rotation of the rotating means in the cap-removal direction prior to rotation of the engaging means.

4,887,734

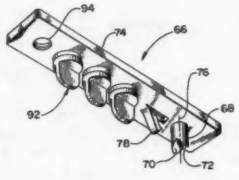
METHOD AND APPARATUS FOR OPENING AND RECLOSING BEVERAGE CANS

Jeffrey A. Larsen, Rte. 3, Box 212, Neillsville, Wis. 54456

Continuation-in-part of Ser. No. 180,531, Apr. 12, 1988, abandoned. This application Feb. 6, 1989, Ser. No. 307,093

Int. Cl.[4] B67B *7/24*

U.S. Cl. 220—306 **6 Claims**



1. Apparatus for opening and reclosing a beverage can comprising:

(a) an aperture piercing tool having:

(i) a generally enongate body,

(ii) cylindrical punch means extending generally perpendicularly away from and located at an end of the elongate body, and

(iii) a hook positioned a predetermined distance away from the punch means and projecting from the body towards the punch means such that the hook is adapted to engage a rim of a beverage can and that punch means is adapted for forming a generally circular aperture in an end wall of the beverage can as the tool is rotated about the rim by the hook; and

(b) an aperture reclosing plug having:

(i) threaded shaft portion,

(ii) a flange portion, and

(iii) a seal portion, and wherein the tool further comprises

(iv) a storage aperture for storing the aperture reclosing plug.

4,887,735

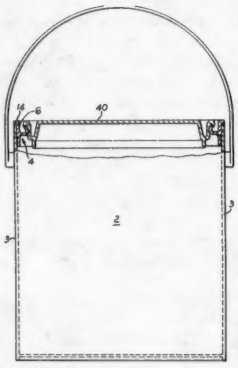
CONTAINER

Henryk Dudzik, Mansfield, United Kingdom, assignor to Mardon Illingworth Ltd., Nottinghamshire, United Kingdom

Filed Dec. 6, 1988, Ser. No. 280,688

Int. Cl.[4] B65D *39/00, 43/06*

U.S. Cl. 220—307 **4 Claims**



1. A container comprising a main container portion having side walls closed at one end and defining an open mouth at the other end, and a moulded rim member having a plug portion slidingly received in the mouth of the main container portion, one of the plug portion and main container portion being provided with a projection received in a corresponding groove in the other portion to retain the rim member in engagement with the main container portion and to provide first sealing means militating against leakage of the contents between the rim member and container portion and a flange extending from the plug portion inwardly of the container and terminating at a skirt which provides a seat for a removable plug-fitting lid wherein the projection comprises a collar extending around an outer surface of the plug portion and received in a corresponding annular groove in the inner surface of the main container portion wherein the collar has leading and trailing faces meeting at an apex, as viewed in cross-section, the leading face flaring outwardly to the apex at an acute angle to the axis of the container and the trailing face tapering from the apex at an acute angle to the transverse direction, perpendicular to said axis, wherein the rim member includes a tubular portion extending from the plug portion towards the closed end of the main container portion, the tubular portion having a maximum outer transverse dimension greater than the inner dimensions of the side walls in the as-moulded state, so that the tubular portion is stressed under compression in its position engaged in the main container portion, whereby the tubular portion bears against the side walls to provide second sealing means militating against leakage of the contents, and wherein the flange is joined to the plug portion at a region aligned with the projection and groove.

4,887,736

SEALED CONTAINER

James M. VanCuchs, Strongsville, Ohio, assignor to Cleveland Container Corporation, Cleveland, Ohio

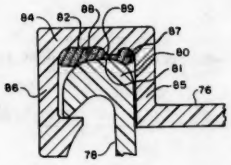
Filed Apr. 22, 1988, Ser. No. 185,126

Int. Cl.[4] B65D *39/00*

U.S. Cl. 220—355 **8 Claims**

1. A container assembly comprising a container and a lid for sealing an open end of said container, said container having a radially outwardly extending curled sealing lip at its upper most periphery, said lid having a peripheral rim including radially inner and outer legs and a bridge extending between

and connecting said legs, said legs and said bridge of said rim cooperatively defining a downwardly opening channel receiving said container lip when said lid is assembled on said container, a seal cavity formed by at least said bridge, said seal cavity including a sealing material received therein which is slightly compressed by said lip when said lid is assembled on said container to form a seal therebetween, said lid having contact surface means for engaging opposed stop surface means on said container lip for limiting further travel of said lid relative to said container thereby to limit the minimum size of said cavity when said lid is pressed onto said container with excessive force to avoid over compression of said sealing material by limiting the minimum size of the seal cavity; said outer leg of said lid including a substantially horizontally and radially inwardly extending hook to engage the bottom outside periphery of said container lip so as to secure said lid on said container; said sealing material being positioned to bias said lid upwardly such that said sealing material biases said substantially horizontally extending hook into contact with said lip;



said contact surface means being of sufficient height that the yield point of said sealing material is not reached and there is no permanent deformation of said sealing material when said lid is pressed onto said container and said contact surface means engage said stop surface means on said lip; said lip including a top surface having a protruding sealing projection for engaging said sealing material and said bridge includes a bottom surface which forms said seal cavity, said sealing projection normally slightly compressing said sealing material when said lid is assembled on said container to provide a seal therebetween, said surface contact means comprising shoulders located on each side of said seal cavity on said bottom surface of said bridge and said stop surface means including opposed shoulders located on each side of said sealing projection on said top surface of said lip, said respective opposed rim and lip shoulders being designed to engage one another when said lid is pressed onto said container under excessive load to stop further lid movement relative to said container and limit the minimum size of said seal cavity.

4,887,737

DISPENSING DEVICE WITH SENSORY ALERT

Marvin L. Adenau, Barrington, Ill., assignor to Thomas A. Schutz Co., Inc., Morton Grove, Ill.

Filed Jun. 10, 1988, Ser. No. 205,444

Int. Cl.[4] B65G *59/00*

U.S. Cl. 221—3 **13 Claims**

1. A theft resistant device for displaying articles, said device comprising:

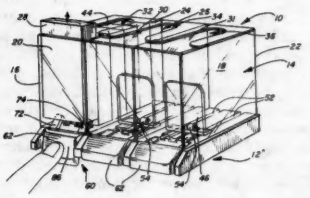
a frame defining a receptacle for an article to be normally displayed in a first position;

means on the frame for inhibiting grasping by a purchaser of an article in the first position;

trigger means mounted to the frame for pivoting movement between a normal position and a release position for moving an article from the first position relative to the frame to a removal position as an incident of said trigger means being pivoted from said normal position to said release position,

said removal position being such that an article in said removal position can be more readily grasped by a purchaser than an article in said first position; and

means at all times engaged with and having at least a portion that follows movement of the trigger means for giving a sensory indication that the trigger means has been moved from the normal position to the release position and that resultingly an article has been situated in the removal position as an incident of the trigger means being moved from its normal position to its release position,



wherein said means for giving a sensory indication comprises means for producing an audible sound as an incident of said trigger means being moved from said normal position to said release position.

4,887,738

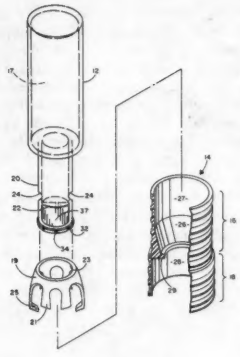
ARTICLE DISPENSER

Paul D. Jennings, 1039 E. Almond Ave., Orange, Calif. 92666, and Kenneth L. Jennings, P.O. Box 83-4, Rte. 2, Strafford, Mo. 65757

Continuation of Ser. No. 24,849, Mar. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 777,969, Sep. 20, 1985, abandoned. This application Jul. 14, 1988, Ser. No. 218,469

Int. Cl.[4] B65G *59/00*

U.S. Cl. 221—264 **9 Claims**



1. An article dispenser for containing and selectively singularly dispensing articles comprising:

a container member having an upper portion and a dispensing portion forming an interior compartment for storing said articles, said upper portion having a greater external diameter than an external diameter of said dispenser portion defining a shoulder at an interface therebetween, said dispensing portion having an article dispenser aperture formed therethrough and at least one gate aperture;

a substantially frusto-conically contoured flexible member having an upper portion opening a diameter substantially equal to said external diameter of said dispensing portion and less than said diameter of said upper portion, said frusto-conical flexible member having a lower portion

defining a plurality of flexible finger members having at least one gating protrusion extending from at least one of said flexible finger members for insert into said gate aperture;

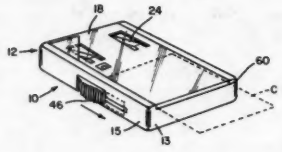
a dispenser control member defining a through passage having an upper section of first substantially uniform internal diameter for slideable interface with said container member upper portion, a central section defining an internal frusto-conical surface which is inverted with respect to said frusto-conically contoured flexible member, and a lower section having a second substantially uniform internal diameter, whereby contact between said flexible member and said lower section of said control member provides (1) a biasing displacement for maintaining said exit aperture adjacent said central section of said dispenser control member, and (2) displacement of said gating protrusions into said gate aperture responsive to a displacement of said upper section of said dispenser control member with respect to said container member.

4,887,739

BUSINESS CARD DISPENSER

Robert J. Parker, 805 E. Moler Ave., Martinsburg, W. Va. 25401

Filed May 31, 1988, Ser. No. 200,588
Int. Cl.[4] B65H *3/00*; B65G *59/00*
U.S. Cl. 221—232 **23 Claims**



1. A dispensing apparatus for dispensing generally planar articles stacked in a vertical array comprising a casing having ends, side, top and bottom walls, an article support plate mounted within said casing, an opening in said casing adjacent one end wall thereof through which articles may be slideably discharged, first resilient means mounted within said casing for resiliently urging said article support plate toward alignment with said opening, an ejector means slideably mounted within said casing, second resilient means connecting said ejector means to said article support plate, means for moving said ejector means between a first and second position, said ejector means having contact means for engaging an article carried by said article support plate as said ejector means is moved from said first to said second position, said second resilient means acting to normally retain said ejector mechanism in said first position and said second resilient means acting to apply a force on said article support plate away from said opening as said ejector means is moved from said first toward said second position.

4,887,740

VALVE FOR BEVERAGE DISPENSER AND THE LIKE

Dell W. Smith, Los Angeles, Calif., assignor to Bar-Master International, Los Angeles, Calif.

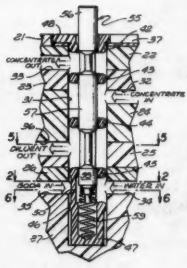
Filed Jun. 3, 1988, Ser. No. 201,938
Int. Cl.[4] B67D *5/56*; F16K *41/00*
U.S. Cl. 222—129.1 **25 Claims**

1. In a valve for control of fluid flow, the combination of:

a housing having a valve bore with inlet and outlet ports;

a seal cartridge slidingly inserted into said bore, said seal cartridge having first and second integrally formed, spaced seal rings in sealing engagement with said bore; and

a valve spindle carried in said seal cartridge in sealing engagement with said seal rings, with said spindle moveable between a valve closed position for blocking fluid flow and a valve open position for flow between said inlet and outlet ports;



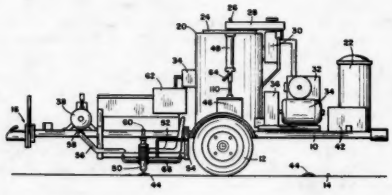
wherein said bore is a smooth cylindrical bore and said seal cartridge is an integral elastomer molded cartridge.

4,887,741

THERMAL ADHESIVE APPLICATOR

Donald M. Downing, 4408 S. 44th W. Ave., Tulsa, Okla. 74107

Filed Mar. 30, 1988, Ser. No. 175,108
Int. Cl.[4] B67D *5/62*
U.S. Cl. 222—146.5 **8 Claims**



1. A dispensing system for heating and dispensing hot materials which comprises:

a vat having an outlet and used for holding the material;

heating means to heat said vat;

a pump assembly connected to said outlet of said vat;

a frame supporting said vat;

a hot material dispensing conduit means having a first section and a second section, said first section having an end A and an end B, said end A being pivotally connected to the outlet of said pump;

said second section having an end C, and an end D;

a swivel assembly connecting end C to said end B;

a dispensing valve connected to said end D;

means to support said swivel assembly from said frame;

an elongated support hook fastened to said second section and having an element substantially parallel to the second section;

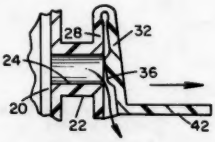
a support hook support rod supported from said frame and extending between said support hook and said second section;

a handle attached to said dispensing valve so that said dispensing valve may be guided.

4,887,742
ONE PIECE DISPENSING VALVE

Henry G. Roethel, and James P. Leigh, both of Ravenna, Ohio, assignors to The Meyer Company, Cleveland, Ohio

Filed Jun. 21, 1988, Ser. No. 209,550
Int. Cl.[4] B67B *5/00*
U.S. Cl. 222—153 8 Claims



1. A valve comprising:

a body defining a fluid passageway having an inlet end and an outlet end;

said body including a first wall member having an orifice through which said outlet end of said fluid passageway opens; said first wall member defining a first surface extending laterally outwardly of said orifice;

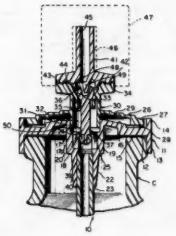
a second wall member having first and second laterally spaced edge portions and a third edge portion connected therebetween, said second wall member formed from a resilient material capable of undergoing significant elastic deformation, said second wall member positioned to overlie said orifice and having said first and second laterally spaced edge portions joined to said first wall at locations laterally outwardly of said orifice throughout a major circumferential extent to thereby cause said second wall member to sealingly engage about said orifice; and,

operating means for selectively deflecting said third edge portion of said second wall member away from said orifice to permit flow through said orifice and between said first and second wall members and past said third edge portion.

4,887,743
AEROSOL VALVE

William S. Blake, 14 Georgetown Ct., Linwood, N.J. 08221

Filed Jun. 10, 1987, Ser. No. 60,171
Int. Cl.[4] B65D *83/00*
U.S. Cl. 222—402.1 28 Claims



1. An aerosol valve, comprising:

a main body and poppet retainer having a central portion with means defining a poppet retainer;

a flexible valve housing and seat member having an outer marginal portion and a central portion and means securing it to said main body, means at the central portion defining a valve seat, flexible means connecting the central portion to the outer marginal portion for movement of the central portion and valve seat relative to the outer marginal portion and main body;

a poppet valve having a valve head at one end and a tail piece extending away from the head, said valve head disposed in cooperative relationship with said valve seat for opening and closing movement between said valve head and valve seat, detent means on said tail piece cooperating with the poppet retainer means on the main body to define spaced detents for limiting movement of the poppet valve in both directions along the axis of the tail piece so that limited relative movement between the valve head and valve seat and between the poppet valve and main body is possible;

means urging said seat member to move in a direction relative to said poppet valve to seat said valve head on said valve seat;

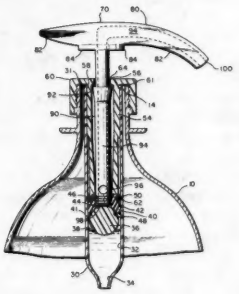
actuator means connected with said flexible valve housing and seat member to move the seat member relative to the poppet valve to move the valve head and valve seat apart to open the valve and enable flow from the container; and

means for securing the valve to an open end of a container.

4,887,744
DISPENSER FOR A CARBONATED BEVERAGE BOTTLE

Forrest D. Williams, 4820 Powell Rd., Fairfax, Va. 22032

Filed Jun. 8, 1988, Ser. No. 203,768
Int. Cl.[4] B65D *83/14*
U.S. Cl. 222—402.1 23 Claims



13. A dispenser for a bottle comprising:

pick-up means for conveying a beverage from the interior of said bottle to an opening at the top of the bottle and being air-tightedly sealed with said top;

a check-ball internal to said pick-up means;

a movable plunger extending through said opening having a columnar neck internal to said pick-up means, a spout external to said bottle, and a chamber through the circumferential surface of said neck to and through said spout;

said neck having stopper means to limit neck motion out of said pick-up means; and

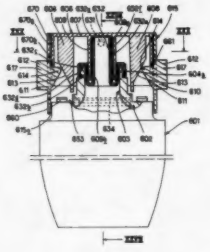
said pick-up means comprising sealing means for creating an air-tight seal between said pick-up means and said neck throughout the range of movement of said neck, means for restricting movement of said check-ball between said sealing means and a portion of said pick-up means, and means for air-tightedly sealing said top that is sealably connected to said sealing means.

4,887,745

CONTAINER COMPRISING A NECK AND A CAP WHICH CAN BE MANIPULATED WITH ONLY ONE HAND

Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

Division of Ser. No. 69,964, Jul. 6, 1987, Pat. No. 4,807,786.
This application Sep. 2, 1988, Ser. No. 239,751
Claims priority, application France, Jul. 7, 1986, 86 09827; Nov. 18, 1986, 86 15991
Int. Cl.[4] B65D 5/72
U.S. Cl. 222—499 11 Claims



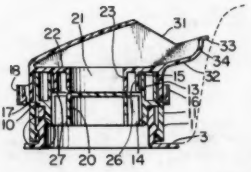
1. A container comprising:
(a) a body delimited by a wall;
(b) a substantially cylindrical spout on said container;
(c) a neck surmounting said body and terminating in said substantially cylindrical spout;
(d) at least one fastening flange means carried by said neck;
(e) a cap adapted to be manipulated with only one hand, said cap comprising a top panel and a side extension to said top panel; and
(f) means for retaining the cap on the container, said means comprising fixing means cooperating with the fastening flange means on said neck; wherein
(g) cooperating first and second means, carried respectively by said side extension and said cap retaining means, are effective to insure displacement of the cap relative to the neck and hence opening of the container, one of said cooperating first and second means comprising a pair of pushing means accessible from outside the cap and arranged substantially symmetrically relative to the spout, said pushing means, when actuated, being displaceable relative to an axis of flexure which is substantially parallel to said top panel of said cap, the other of said cooperating first and second means comprising inclined ramp means serving as bearing surfaces for said pushing means when the pushing means are actuated and wherein;
said retaining means comprises an element surrounding the cap, said element having a wall to which the pushing means are joined; the top panel of said cap supporting sealing means adapted to slide along a wall of said spout1; and means defining an opening in said sealing means, said opening being adapted to be closed by the wall of the spout when the cap is in a closed position, and said opening being separated from said wall by translational movement of the cap when the pushing means are actuated so as to communicate said spout with a lateral duct in the cap for the ejection of a product contained in the container.

4,887,746

TWO-PIECE SCREW CLOSURE FOR CONTAINERS

Werner F. Dubach, Maur, Switzerland, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 13, 1987, Ser. No. 108,242
Claims priority, application Switzerland, Oct. 14, 1986, 04086/86
Int. Cl.[4] B67D 5/06
U.S. Cl. 222—519 12 Claims



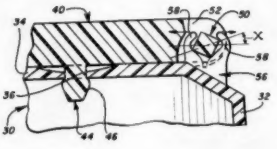
1. Two-piece screw closure for containers comprising a lower part which is connected to the container neck and has a sealing plug and at least one lead-through opening made peripherally thereto, said lower part further comprising inner and outer concentric annular walls connected at a level intermediate the ends of both said inner and said outer concentric annular walls via a horizontal connecting wall, the ends of said inner annular wall being cantilevered therefrom and, said inner annular wall below said horizontal connecting wall being in sealing engagement with the inner wall of said container neck, said screw closure further comprising a screw lid with a pouring opening, and that extending from the pouring opening in the screw lid surface is an annular wall which protrudes downwardly from said screw lid and is directed towards the sealing plug and, an outer sidewall provided with an internal thread, whereby in the closed position of the closure, the annular wall of the screw lid rests in sealing manner on the sealing plug and that, extending over the pouring opening and diagonally over the screw lid a pouring spout with the screw closure at the same time being transferred from the sealing position into the open position by turning the screw lid from the closed position into the pouring position.

4,887,747

TWO-PIECE, SNAP-ACTION CLOSURE

Efrem M. Ostrowsky, Highland Park, and John P. Kinsley, Crystal Lake, both of Ill., assignors to Seaquist Closures, a division of Pittway Corporation, Crystal Lake, Ill.

Filed Jun. 8, 1988, Ser. No. 204,166
Int. Cl.[4] B65D 47/08
U.S. Cl. 222—556 9 Claims



1. A container closure which can be readily disassembled and assembled for use on a container defining an opening communicating with the container interior, said closure comprising:
a body for being mounted to said container over said container opening and defining a dispensing orifice for communicating through said container opening with said container interior;

a cover separate from said body and disposed on said body for being pivoted about an axis between a closed position occluding said dispensing orifice and an open position spaced away from said dispensing orifice;

a shaft defining said axis on one of said cover and body, said shaft having a generally square axial cross section defining corners on said shaft; and

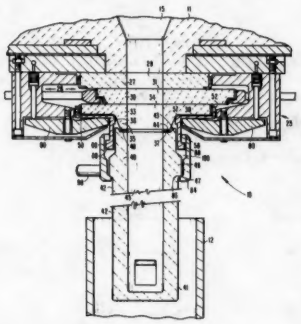
a pair of spaced-apart fingers projecting from the other of said cover and body, said fingers of each pair defining between them a receiving region for receiving a portion of the length of said shaft, each said finger defining a concave indentation substantially complementary to a corner of said shaft, each finger of a pair being elastically deformable in directions toward and away from the other finger of the pair and being most stressed when said cover is at an over center point between said open and closed positions and said shaft corners are out of registry with said finger concave indentations whereby the reaction forces between said shaft and fingers thereby bias said cover toward at least one of said open and closed positions and wherein when said cover is in said closed position, said shaft corners are out of registry with said finger concave indentations.

4,887,748

APPARATUS AND METHOD FOR ATTACHMENT OF SUBMERGED NOZZLE TO LOWER PLATE OF SLIDING GATE VALVE MECHANISM FOR A CONTINUOUS CASTING OPERATION

James W. Hicks, St. John, Ind., assignor to J. W. Hicks, Inc., St. John, Ind.

Filed Dec. 29, 1986, Ser. No. 947,399
Int. Cl.[4] B22D *41/00*
U.S. Cl. 222—606 **7 Claims**



1. A method for attaching a submerged nozzle to an operationally replaceable lower plate of a sliding gate valve system for a continuous casting operation, said method comprising:

placing a lower plate in a lower plate container having a downwardly extending cylindrical portion, the lower plate container further having a plurality of lower plate attachment means extending radially from the downwardly extending cylindrical portion, the plurality of lower plate attachment means being approximately equidistantly disposed about the downwardly extending cylindrical portion;

placing a submerged nozzle within a submerged nozzle retainer having an upwardly extending cylindrical portion, the lower plate and the submerged nozzle collectively defining an operator adjustable seal therebetween, the nozzle retainer being angularly movable independent of the lower plate and independent of the submerged nozzle during continuous casting operations of the molten metal, the submerged nozzle retainer further having a plurality of nozzle attachment means extending radially from the upwardly extending cylindrical portion, the plurality of attachment means being approximately equidistantly disposed about the upwardly extending cylindrical portion and being configured for cooperative engagement with said lower plate attachment means, the cooperative engagement being such that relative angular movement in one direction uniformly tightens the operator adjustable seal between the lower plate and the submerged nozzle and in the opposite direction uniformly loosens the seal between the lower plate and the submerged nozzle to allow selective operator adjustment of the tightness of said seal during continuous casting operations of molten metal; the submerged nozzle retainer further having handle means extending outwardly radially from the upwardly extending portion of said nozzle retainer for remote relative adjustment during operation;

pre-assembling the submerged nozzle retainer to the lower plate container by engagement of the submerged nozzle retainer attachment means to the lower plate container attachment means to construct a snugly configured lower plate/submerged nozzle assembly;

placing the snugly configured lower plate/submerged nozzle assembly in an operative position in a sliding gate valve system;

waiting for thermal and mechanical effects to act upon the lower plate/submerged nozzle assembly caused by continuous casting of molten metal; and

tightening the lower plate/submerged nozzle assembly during continuous casting operations of molten metal by remotely turning the handle means of the submerged nozzle retainer relative to the lower plate container while maintaining the submerged nozzle in the same relative position with respect to the lower plate container.

4. A coupling assembly for attaching a submerged nozzle to an operationally replaceable lower plate of a sliding gate valve system for a continuous casting operation, said coupling assembly comprising:

a lower plate container defining a central recess for receiving a lower plate, and including a downwardly extending cylindrical portion, said lower plate container further including a plurality of lower plate attachment means extending radially from said downwardly extending cylindrical portion, said plurality of lower plate attachment means being approximately equidistantly disposed about said downwardly extending cylindrical portion;

a submerged nozzle retainer defining a central recess for receiving a submerged nozzle, and including an upwardly extending cylindrical portion, said submerged nozzle retainer further including a plurality of nozzle attachment means extending radially from said upwardly extending cylindrical portion, said plurality of attachment means being approximately equidistantly disposed about said upwardly extending cylindrical portion and being configured for cooperative engagement with said lower plate attachment means, the cooperative engagement being such that relative angular movement in one direction uniformly tightens the seal between the lower plate and the submerged nozzle and in the opposite direction uniformly loosens the seal between the lower plate and the submerged nozzle;

handle means extending outwardly radially from said upwardly extending portion of said nozzle retainer for remote relative adjustment during operation;

submerged nozzle position maintaining means for maintaining the submerged nozzle in the same relative position with respect to said lower plate container when said submerged nozzle retainer is angularly moved relative to said lower plate container during operation;

an annular gasket of refractory material disposed between the nozzle and the lower plate, wherein said submerged nozzle position maintaining means includes means for providing that the coefficient of friction between the nozzle and said nozzle retainer is less than the coefficient of friction between the submerged nozzle and said gasket

during operation, whereby the submerged nozzle is maintained in the same relative configuration during operational adjustment, wherein said submerged nozzle position maintaining means includes an application of graphite powder between said submerged nozzle retainer and the submerged nozzle.

4,887,749

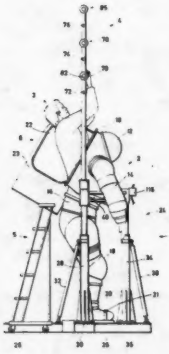
DON/DOFF SUPPORT STAND FOR USE WITH REAR ENTRY SPACE SUITS

Joseph J. Kosmo, Seabrook; Terry O. Tri, Friendswood; William E. Spenny, League City, and Philip R. West, Houston, all of Tex., assignors to United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 19, 1988, Ser. No. 221,472

Int. Cl.[4] A47G *25/90*

U.S. Cl. 223—111 **12 Claims**



1. A don/doff support stand for use with rear entry space suits having at last one protruding locking lug comprising:

(a) an adjustable pedestal assembly;

(b) a retainer to receive said lug and support said space suit, said retainer tiltably mounted on said pedestal assembly;

(c) means for locking said lug in said retainer; and

(d) means for adjusting the tilt of said retainer relative to said pedestal assembly, said retainer causing said locking lug and said rear entry of said space suit to simultaneously tilt when said means for adjusting said tilt is actuated.

4,887,750

RACK ARRANGEMENT

Robin K. Dainty, Brighton, England, assignor to British Gas plc, London, England

Filed Apr. 13, 1988, Ser. No. 181,175

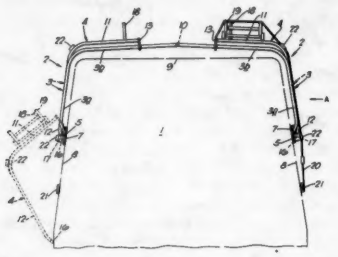
Claims priority, application United Kingdom, Apr. 13, 1987, 8708804

Int. Cl.[4] E06C *5/04*; B60R *11/06*

U.S. Cl. 224—42.11 **16 Claims**

1. A rack arrangement comprising two substantially parallel elongate guide members each having a lower generally vertically extending portion and an upper generally horizontally extending load supporting portion; a load carrier member movably connected to the guide members and manually slidable from a lowered position upwardly along the lower guide member portions onto the supporting portions to a load storage position, said carrier member

including means for holding a load thereto and having a mounting member with two apertures defined by a friction reducing material, said guide members extending through a respective one of said apertures and each aperture surrounding a respective one of the guide members with sufficient clearance so as to be in loose, rockable, slidable, frictional engagement therewith; and means for releasably retaining the carrier member in the load storage



position, whereby said mounting member is movable relative to said guide members by frictional sliding contact between said friction reducing material and said guide members while rocking said carrier member.

4,887,751

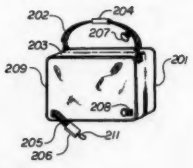
TRAVELER'S ORGANIZER BAG LUGGAGE

Michael Lehman, 1133 Van Nuys St., San Diego, Calif. 92109

Continuation-in-part of Ser. No. 139,323, Dec. 30, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,969

Int. Cl.[4] A45C *3/00, 5/14*

U.S. Cl. 224—151 **16 Claims**



1. Travel luggage adapted to be carried by a user which comprises:

a box-like container;

a first strap attached at two points at opposite edges of said container;

a second strap attached at one location spaced apart from at least one of said points and having a first detachable means for fastening at the other end of said second strap;

a second detachable means for fastening said first strap to said second strap; and

wherein said straps and means for fastening are shaped and dimensioned to support said container on the back of said user when said first strap is placed over one shoulder and said second strap extends from proximate said back, around the opposite side of said user and is fastened to said second detachable means proximate to the front of said user.

4,887,752

SELF-LOCKING TRANSPORT STRAP

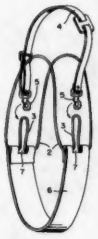
Adriaen E. R. Nauta, 101B Josephstreet, 3002 EE Rotterdam, Netherlands

PCT No. PCT/EP83/00191, § 371 Date Mar. 15, 1984, § 102(e) Date Mar. 15, 1984, PCT Pub. No. WO84/00286, PCT Pub. Date Feb. 2, 1984

PCT Filed Jul. 19, 1983, Ser. No. 598,347

Int. Cl.[4] A45F *3/14;* B63B *35/72*

U.S. Cl. 224—202 3 Claims



1. A self-locking transport strap, particularly adapted to carry a heavy or irregularly shaped object, said transport strap comprising: flexible support band means adapted to pass underneath and along opposite upwardly extending sides of an object which is to be supported, said support band means having a pair of ends, each of which ends includes at least two spaced openings; an endless belt adapted to pass over the top of an object which is to be supported and slidably guided in and connected respectively through said openings at each end of said support band means to provide two end loops interconnecting the ends of said band means and at least one intermediate loop at each end of said band means and extending outwardly from said band means between said openings; and carrying means connected to said intermediate loops for carrying an object which is to be supported, the endless belt being drawn tightly against the object to securely carry the object when a lifting force is applied to said carrying means.

4,887,753

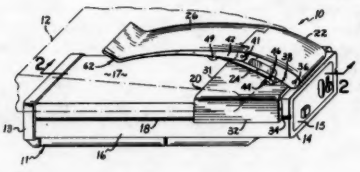
VISOR CLIP FOR MOUNTING RADAR DETECTOR

Paul M. Allen, Cincinnati, Ohio, assignor to Cincinnati Microwave, Inc., Cincinnati, Ohio

Filed Nov. 21, 1988, Ser. No. 274,003

Int. Cl.[4] A45F *5/02*

U.S. Cl. 224—312 11 Claims



1. The combination comprising:

a visor clip for securing a police radar detector to the underside of a visor of a vehicle of a thickness unspecified over a predetermined range;

a police radar detector having an upper planar surface, a front end disposed to be oriented toward the front of said vehicle, and a rear end;

said visor clip comprising a base removably securable on said upper surface of said detector, said visor clip having an outer surface and an inner surface;

said visor clip further comprising a parallel linkage assembly including a first leg and a second leg each having upper and lower ends, each said first and second leg extending upwardly from, and having its lower end hingedly connected to, said outer surface of said base, said first leg being connected to said outer base surface so as to pivot about a first horizontal axis parallel to said rear end of said detector, said second leg being connected to said outer base surface so as to pivot about a second horizontal axis located on said base a fixed distance forward of said first axis, said parallel linkage assembly also including a clamp arm having a forward tip and a back end, said clamp arm being hingedly attached at its back end to said upper end of said first leg and being hingedly attached to said upper end of said second leg at a point on said arm displaced forwardly of the back end of said arm a distance equal to said fixed distance, whereby a parallelogram is formed by said legs and said base and said arm with said arm being maintained in parallel relationship with said base as it is movable toward and away from said base.

4,887,754

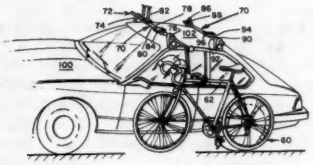
PORTABLE APPARATUS FOR RETAINING A BICYCLE

Scott M. Boyer, Valencia; Steven J. Cole, Arcata; Roger A. Gauvin, Saugus, and Joe C. Mitchell, Canyon Country, all of Calif., assignors to Answer Products, Inc., Valencia and Yakima, Inc., Arcata, both of, Calif.

Filed Oct. 5, 1988, Ser. No. 253,768

Int. Cl.[4] B60R *9/00*

U.S. Cl. 224—319 24 Claims



1. An apparatus to be used in conjunction with a sports rack attached to the roof of a vehicle, the sports rack having at least one elongated hollow rod, the apparatus to be used for retaining a bicycle, comprising:

a. an upper elongated hollow rod having an exterior cross-section smaller than the interior cross section of the at least one elongated hollow rod of said sports rack and capable of insertion into said at least one elongated hollow rod of sports rack;

b. the surface of the upper elongated hollow rod having at least one split adjacent one end and capable of having its exterior cross section expanded to a larger cross section at the location of the at least one split;

c. a plug member located adjacent the end of said upper elongated hollow rod having said at least one split and capable of insertion into said upper elongated hollow rod to thereby increase the cross section of the upper elongated hollow rod at the location of said at least one split;

d. means for drawing said plug member into said upper elongated hollow rod;

e. a lower elongated rod rotatably attached to a clamping means at one end, the clamping means having clamps for retaining a bicycle; and

f. a transverse separation member connecting said upper elongated hollow rod to said lower elongated rod in a manner wherein said lower elongated rod is spaced apart from said upper elongated hollow rod and said clamping means is positioned away from the vehicle when said upper elongated hollow rod is inserted into and retained

within said at least one elongated hollow rod of said sports rack;

g. whereby said upper elongate hollow rod may be inserted into said at least one elongated hollow rod of said sports rack and secured therein by a press fit formed from the expansion of one end of said upper elongated hollow rod when said plug member is caused to be inserted into it, and said clamping means can be attached to a portion of a bicycle for supporting the bicycle.

4,887,755

ADJUSTABLE TABLET BREAKING APPARATUS

Kenneth J. Gibilisco, Warminster, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 7, 1989, Ser. No. 307,812
Int. Cl.[4] B26F *3/00*
U.S. Cl. 225—103 **6 Claims**

1. A tablet breaker assembly adjustable to break any size tablet or caplet comprising:

(a) an anvil having about a vertical axis a downward base to secure said assembly, an outward axial face, a circular upward radial face, guiding surfaces to confine slideable flanges along the surface of said circular upward radial face to a guidepath defined along a diameter of said upward radial face, and a rigid ridgelet projecting upward from said upward radial face, positioned along a diameter, and centered about said axis, said rigid ridgelet presenting an apical surface in said guidepath providing fulcrum means for dividing a downward force between the portions of a tablet;

(b) a crank positioned about said axis, said crank having an inward axial face rotatably mounted about said outward axial face of said anvil, said crank having a downward circular radial face centered about said axis and positioned above said circular upward radial face of said anvil whereby a cavity is defined there between containing said guidepath and said rigid ridgelet, said crank having an aperture in said downward radial face centered about said axis with size and shape to allow said tablet to be placed into said cavity and onto said rigid ridgelet, and said crank having driving means engageable to provide radial reciprocating motion to slideable flanges in said guidepath;

(c) grasping means contained in said cavity comprising two radially reciprocating slideable flanges closing radially inward or opening radially outward along said guidepath engaged with said driving means by coupling means and engaged with said guiding surfaces by guided surfaces to secure or release a tablet on said rigid ridgelet with rotation or counterrotation of said crank; and

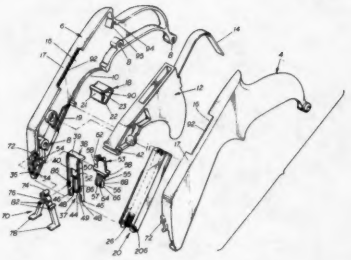
(d) a hammer having flexible attachment means to said tablet breaker assembly and having contact surfaces to contact the upper side of said tablet on opposite sides of said rigid ridgelet whereby a downward force may be applied and divided by said fulcrum means between portions of the tablet and the tablet thereby broken.

4,887,756

SURGICAL STAPLER PROVIDING VARIABLE DEGREE OF STAPLE CLOSURE

David P. Puchy, P.O. Box 382, Epping, N.S.W. 2121, Australia

Continuation of Ser. No. 826,869, Jan. 7, 1986, abandoned. This application Apr. 21, 1988, Ser. No. 186,706
Claims priority, application Australia, May 7, 1984, PG4869
Int. Cl.[4] A61B *17/00*
U.S. Cl. 227—19 **33 Claims**



1. Surgical staple element applicator, comprising:

a body adapted to be hand-held and having a forward end;

said body forming a stapling station at said forward end;

a staple-hold magazine mounted with said body for feeding a staple blank into position for reforming and implanting into the skin of a patient;

a staple driving die, said body having driving die mount means mounting said staple driving die for movement between raised and lowered positions, said driving die including pushing means for engaging and reforming said staple blank to a final substantially hexagonal configuration;

an anvil means for receiving a staple blank from said staple-holding magazine for engagement by said driving die pushing means;

said body including anvil mount means mounting said anvil means for movement between release and work positions;

a displaceable trigger assembly and trigger mount means mounting said displaceable trigger assembly with said body for pivotal movement, said displaceable trigger assembly being operably attached to said staple driving die for moving said staple driving die between said raised and lowered position in order to reform said staple blank into a substantially hexagonal configuration;

a forceps assembly mounted with said body, said forceps assembly including a pair of downwardly extending leg members connected to a resiliently flexible clevis;

at least one skin gripping pad located on each of said leg members; and

said forceps assembly including cam engagement means for engaging complementary cam means on said driving die such that said pair of leg members and pads are converged to a stationary inner position in response to movement of said staple driving die from said raised toward said lowered position in order to selectively approximate the wound edges.

4,887,757

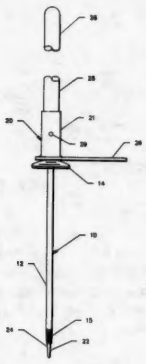
FIXATION STAKE FOR BENTHIC BARRIER

Todd J. Bridgewater, Freeland, and John E. Plott, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 23, 1988, Ser. No. 197,781
Int. Cl.[4] B25C *7/00*
U.S. Cl. 227—147 **3 Claims**

1. Apparatus for installing thin-walled hollow tubular stakes

into the earth comprising an upright handle portion, a horizontally extending foot pedal at the base of said portion suitable for application to said apparatus of downward driving pressure and a downwardly extending rigid solid rod integral with said



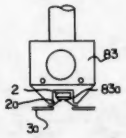
handle portion adapted to receive thereon a hollow tubular stake for implantation into the earth by application of pressure to said horizontal member, said rod having a length slightly greater than said stakes.

4,887,758

APPARATUS FOR CONNECTING EXTERNAL LEADS

Yasunobu Suzuki; Motohiko Kato; Akio Bando, all of Tokyo; Hisao Ishida, Saitama, and Akihiro Nishimura, Tokyo, all of Japan, assignors to Kabushiki Kaisha Shinkawa, Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 302,473
Int. Cl.[4] B23K *20/26;* H01L *21/603*
U.S. Cl. 228—5.1 **3 Claims**



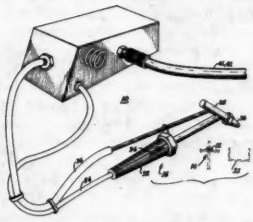
1. An apparatus for connecting external leads comprising:
- a punch-out means which removes solid-state devices from a film carrier by punching them out;
- a raising and lowering arm provided with a suction-adhesion head which holds said punched-out devices by suction adhesion;
- a lead frame feeding means which feeds lead frames, on which said solid-state devices are to be mounted, along a predetermined path;
- an X-Y table which carries said raising and lowering arm and moves longitudinally and laterally so that it conveys said raising and lowering arm to a point above a first bonding station on said lead frame conveyance path;
- a vertical driving mechanism provided on said X-Y table, said vertical driving mechanism driving said raising and lowering arm up and down;
- a first bonding means provided on said first bonding station and equipped with a bonding tool which has an escape part formed therein so that it does not interfere with the suction-adhesion head part of said raising and lowering arm, said first bonding tool simultaneously bonding the leads provided along two opposite sides of each of said solid-state device to one of said lead frames while said solid-state device is pressed against said lead frame by said suction-adhesion head; and
- a second bonding means provided on a second bonding station on said lead frame conveyance path, said second bonding means being provided with a bonding tool which simultaneously bonds leads provided on the other two opposite sides of each solid-state device to the said lead frame.

4,887,759

DESOLDERING APPARATUS

Larry G. Alexander, Indianapolis, Ind., assignor to Leads Metal Products, Inc., Indianapolis, Ind.

Filed Jul. 25, 1988, Ser. No. 223,392
Int. Cl.[4] B23K *3/00*
U.S. Cl. 228—20 **4 Claims**



1. Apparatus for desoldering a work site which has received solder, the apparatus comprising:
- a tool having a tool tip carrying a hollow tip tube, heating means for the tool tip, and a handle by which the tool tip is supported and may be moved in its operativity of withdrawing solder from the work site and carrying it to an associated discard station,
- pneumatic tube means, which include the tip tube, being provided for creating, at the option of an operator, a vacuum in the tip tube, by which solder may be drawn into the tip tube and pneumatic tube means, or an over-atmospheric pressurization of the tip tube, by which solder drawn into the tip tube and pneumatic tube means may be dispensed therefrom,
- switch means for controlling the pneumatic tube means and for controlling the heating means,
- the improvement for such desoldering apparatus, comprising, in combination,
- an air cylinder having a movable piston means therein and having spring means biasing the piston means in a certain direction,
- means supplying air at over-atmospheric pressure to the air cylinder, from an associated source of compressed air, on a first side of the piston means to move the piston means in an opposite direction, achieving a storage of energy in the spring means for achieving the said biasing of the piston means,
- the pneumatic tube means connecting the tip tube with the air cylinder on the side of the piston means opposite to that connectable to the solenoid valve means mentioned below,
- a solenoid valve means having pneumatic circuitry operatively connected to the source of compressed air and to the air cylinder, with a pressure-line valve means for providing an operative connection therebetween,
- the solenoid valve means having a vent-line venting means for venting air from the air cylinder,
- the solenoid valve means having control means which is capable of moving the pressure-line valve means to (a) a closed position, blocking the communication of air from the compressed air source to the air cylinder, and moving

the vent-line valve means to (b) an open position to interconnect the air cylinder and the venting means,

the venting of the air cylinder permitting the spring means to move the piston means in the said certain direction, and the said movement of the piston means in the said certain direction creating a vacuum in the air cylinder on the said opposite side of the piston means and thus also creating a vacuum in the pneumatic tube means and in the tip tube, for drawing into the tip tube and the pneumatic tube means the solder to be removed from the work site.

the control means of the solenoid valve means also being capable of moving the pressure-line valve means to (c) open position opening the communication of air from the compressed air source to the air cylinder, and moving the vent-line valve means to (d) a closed position blocking the communication of the air cylinder with the venting means,

the arrangement providing operativity as follows:

with the solenoid valve means' pressure-line valve means in open position "c", and its vent-line valve means in closed position "d", the air pressure in the air cylinder on the first side of the piston means will have caused the piston means to have moved in said opposite direction, against the bias of the spring means, and storing energy in the spring means;

and, assuming that the user then positions the tool operatively adjacent the work site, the user may operate the switch means to control the solenoid valve means' control means to cause the solenoid valve means' pressure-line valve means to go to closed position "a" and the vent-line valve means to open position "b," whereupon the bias of the spring means will cause it to move the piston means in the said certain direction, establishing a vacuum momentarily in the pneumatic tube means and tip tube, operative to withdraw solder from the work site;

and then, assuming that the user moves the tool to the discard station, the user may actuate the switch means to control the solenoid valve means' control means to cause the solenoid valve pressure-line valve means to go to open position "c" and the vent-line valve means to go to closed position "d",

(whereupon, against the bias of the spring) means, the air pressure in the air cylinder on the first side of the piston means will cause the piston means to move in said opposite direction, establishing over-atmospheric pressure in the air cylinder on the said opposite side of the piston means, thus also establishing above-atmospheric pressure in the pneumatic tube means and tip tube, forcing a dispensing therefrom of solder which had been withdrawn from the work site and into the tip tube and the pneumatic tube means.

4,887,760

BONDING SHEET FOR ELECTRONIC COMPONENT AND METHOD OF BONDING ELECTRONIC COMPONENT USING THE SAME

Thunekazu Yoshino, Kamakura; Hiroshi Morita, Kawasaki; Hirotaka Nakano, Yokohama; Nobuo Hayashi, Miura, and Yuko Kubota, Kamakura, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 27, 1987, Ser. No. 89,989

Claims priority, application Japan, Aug. 27, 1986, 61-198915; Sep. 25, 1986, 61-224763; Sep. 25, 1986, 61-224766

Int. Cl.[4] B23K *31/00, 35/14, 35/24*

U.S. Cl. 228—56.3 **23 Claims**

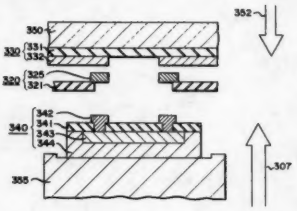
1. A bonding sheet for an electronic component, comprising:

a substrate having an opening, and

a plurality of low-melting point bonding metal strips disposed at and projecting from a peripheral portion of said opening of said substrate, toward an inner portion of said opening but not completely closing said opening.

12. A method of bonding an electronic component comprising:

a first step of arranging, between electrode terminals of the electronic component and a conductor pattern to be electrically connected to said terminals, a bonding sheet for an electronic component, comprising a substrate having an opening, and a low-melting point bonding metal plurality of disposed at and projecting from a peripheral portion of



said opening of said substrate, toward an inner portion of said opening but not completely closing said opening; and

a second step of bonding said electrode terminals and said conductor pattern through said low-melting point bonding metal strips.

4,887,761

METHOD OF MAKING EXPLOSIVELY BUNDED MULTI-LAMINAR COMPOSITE METAL PLATE

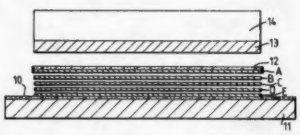
Roy Hardwick, Troon, Scotland, assignor to Imperial Chemical Industries PLC, London, England

Filed Nov. 25, 1988, Ser. No. 276,350

Claims priority, application United Kingdom, Dec. 16, 1987, 8729340

Int. Cl.[4] B23K *20/08*

U.S. Cl. 228—107 **9 Claims**



1. A method of making an explosively bonded multi-laminar composite metal plate wherein a plurality of overlapping parallel metal plates are initially assembled with a stand-off space between adjacent plates and the plates are metallurgically bonded at their interfaces by progressively propelling the plates together against a restraining means by means of a layer of explosive material disposed parallel to and overlying the plates and initiated to detonate in a direction parallel to the plates at a velocity of less than 120% of the velocity of sound in the plate having the lowest sonic velocity, characterised in that in the initial assembly a driver plate is disposed over a first one of the said plates and spaced therefrom at a stand-off distance of at least half the driver plate thickness, a buffer layer of granular inert material is disposed between the driver plate and the said first plate and the explosive layer is disposed over the driver plate, the mass of said driver plate being at least equal to the total mass of the plates being propelled by the said explosive layer and the thickness of said buffer layer being sufficient to prevent welding of the driver plate to the said first plate.

4,887,762

SOLDER COATING PROCESSES

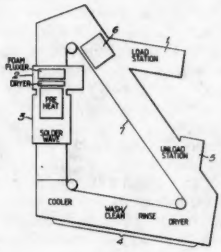
William H. Baker, Filton, United Kingdom, assignor to British Aerospace Public Limted Company, London, United Kingdom

Filed Feb. 29, 1988, Ser. No. 162,201

Claims priority, application United Kingdom, Mar. 12, 1987, 8705913

Int. Cl.[4] H05K 3/34

U.S. Cl. 228—260 11 Claims



1. Apparatus for producing a solderable surface on solder pads of a plurality of leadless ceramic chip packages each containing a semiconductor device, the apparatus comprising:

a loading means for loading the packages onto a movable carrier;

a flux foaming means for activating the solder pads of each package;

a solder coating means for solder coating the solder pads of each package;

a cleaning means for removing excess flux from each package; and

an unloading means for unloading the packages from the carrier wherein the loading means, flux foaming means, solder coating means, cleaning means and unloading means are arranged in a loop configuration, wherein each package is generally rectangular in shape and is loaded onto a carrying surface of the movable carrier so that a straight edge of the package in a plane parallel to said surface is inclined to the direction of motion of the carrier.

4,887,763

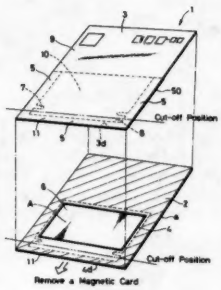
TRANSMITTAL ARTICLE FOR MAGNETIC CARDS

Toshikazu Sano, Takamatsu, Japan, assignor to Shinnihon Printing Co., Ltd., Kagawa, Japan

Filed Mar. 29, 1989, Ser. No. 330,034

Int. Cl.[4] B65D 27/04

U.S. Cl. 229—71 4 Claims



1. A transmittal envelope for a magnetic card comprising:

a. a lower sheet of paper provided with an opening through which the magnetic card is exposed;

b. a transparent film adhering to a rear surface of said lower sheet, so as to cover said opening, and

c. an upper sheet of paper at least a part of which is mounted upon said lower sheet, so as to cover said opening, characterized in that a magnetic card enclosure is defined by said upper sheet and said lower sheet to receive and hold the magnetic card within said opening, such that the presence of the card within the envelope may be confirmed through said transparent film.

4,887,764

PACKAGING BOX HAVING AN IMPROPER TEAR PREVENTION STRUCTURE

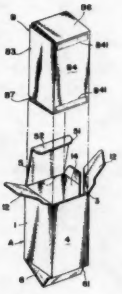
Yoshiharu Ogura, Osaka, Japan, assignor to Ogura Art Printing Co., Ltd., Osaka, Japan

Filed Jun. 28, 1988, Ser. No. 212,705

Claims priority, application Japan, Feb. 22, 1988, 63-38803

Int. Cl.[4] B65D 5/08

U.S. Cl. 229—102 4 Claims



1. A tamper-resistant packaging box structure comprising an outer box having a front wall, side walls, a back wall, a base and a top cover flap extending from the back wall and including a foldable tongue at a forward end thereof for insertion internally of the box body along a top portion of the front wall, the structure further comprising a separate inner box frame inserted inside of the outer box body, said frame including a front panel situated adjacent to the front wall of the outer body, said tongue fitting between the front wall and said panel, said tongue further having adhesive on an inner surface thereof securing same to said panel.

4,887,765

FLUID PACK AND PROCESS FOR THE PRODUCTION THEREOF

Hans Rausing, Wadhurst, England, assignor to Tetra Pak Finance & Trading S.A., Pully, Switzerland

Continuation of Ser. No. 24,649, Mar. 11, 1987, abandoned. This application Oct. 26, 1988, Ser. No. 266,273

Claims priority, application United Kingdom, Mar. 11, 1986, 8605911

Int. Cl.[4] B65D 5/70, 5/72

U.S. Cl. 229—123.2 5 Claims

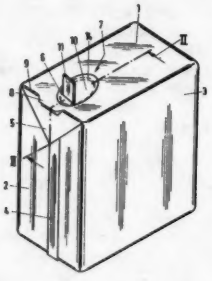
1. A fluid pack comprising:

a pack body formed from a sheet material in the form of paper coated with plastic on the inner and outer surfaces thereof and defining at least one side wall, a bottom and a cover, said side wall, said bottom and said cover being interconnected and having an inner surface and an outer surface;

said pack body defining a hole therethrough, said hole defining an edge around the periphery thereof,

opening means for normally closing said hole in said pack body while permitting opening thereof, said opening means including a cover strip formed from an injected plastic material;

said cover strip being molded in situ of plastic material having annular, integral edge engagement means formed about the periphery of said cover strip and sealingly surrounding said edge and extending onto both said inner and said outer surfaces adjacent said edge around the complete periphery of said hole and fused with the plastic coating of said sheet material at said inner and outer surfaces adjacent said edge, and



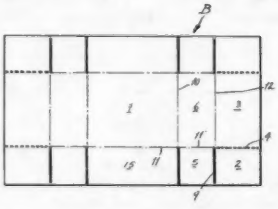
a panel portion of said cover strip defined as an area radially within the boundary of said edge engagement means and having at least one marginal edge thereof defined by a tear line, said panel portion being at least partially separable from the remainder of said strip by separation along said tear line.

4,887,766

CONTAINER AND ONE-PIECE BLANK FOR FORMING SAME

Melvin W. Schoeneweis, P.O. Box 369, California, Mo. 65018

Filed Aug. 10, 1988, Ser. No. 230,493
Int. Cl.[4] B65D *5/64*
U.S. Cl. 229—125 **4 Claims**



1. A rectilinear rigid container assembled by travel of a male forming mandrel pushing a single rectangular blank of paperboard past a female container-forming apparatus, said single blank of paperboard comprising:

a container base panel;

a pair of parallel, opposed end wall panels;

a pair of parallel, opposed side wall panels positioned pependicular to and intervening the end wall panels upon assembly;

said side and end wall panels together defining a rectangular perimeter of said container's top opening, having a circumference equal to that of said container base panel;

a pair of lid sections integral with and hingedly attached to the end wall panels along fold lines;

said lid sections being of sufficient width and length that when bent inward along such fold lines as to substantially and completely cover such assembled container top opening area;

four end wall flange panels, two of which are oppositely and hingedly attached to each of said end wall panels, said end wall flange panels providing double thickness support to the side wall panels and thereby increasing the stacking strength of the assembled container;

four lid section flange panels, two of which are oppositely and hingedly attached to each of said lid sections, each lid section flange panel being bendably attached to its adjacent lid section by means of a double line of weakness so as to provide for closure of the container;

said lid section flange panels providing triple thickness support to the side wall panels and thereby increasing the stacking strength of the assembled container;

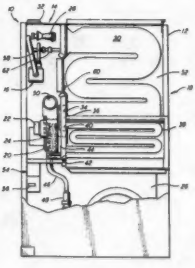
four bridge tabs, one of which rigidly maintains each lid section flange panel integral and mutually planar with its adjacent end section flange panel, thereby preventing said lid section flanges from free movement or inappropriately contacting the female container-forming apparatus during assembly; each bridge tab being removable during assembly to facilitate closure of the container.

4,887,767

LIMIT SWITCH CONTROL METHOD FOR A TWO-STAGE FURNACE

Kevin D. Thompson, and Gary W. Ballard, both of Indianapolis, Ind., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Oct. 21, 1988, Ser. No. 260,973
Int. Cl.[4] G05D *23/12*
U.S. Cl. 236—1 EB **13 Claims**



1. A method of operating a gas furnace of the type having a control system for selectively operating in either of two stages of operation and a gas valve which is responsively operable in either a low or high fire mode comprising the steps of:

determining whether, when the control system is calling for a low fire mode, the gas valve is in a high fire mode; and

responsively restricting the control system to operation in a high fire only mode.

4,887,768

Patent Not Issued For This Number

4,887,769

ELECTROMAGNETIC FUEL INJECTION VALVE

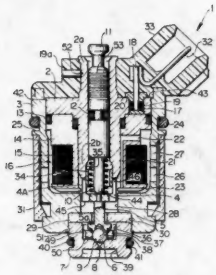
Yoshio Okamoto; Yozo Nakamura, both of Ibaraki; Kyoichi Uchiyama, Kashiwa; Haruo Watanabe; Tokuo Kosuge, both of Ibaraki; Akira Onishi, Tsuchiura; Akashi Terasaki; Hiroyuki Ando, both of Katsuta, and Eiji Hamashima, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,261

Claims priority, application Japan, Jun. 26, 1987, 62-157527; Sep. 25, 1987, 62-238752; Jan. 13, 1988, 63-3737

Int. Cl.[4] B05B *1/30, 1/34*

U.S. Cl. 239—493 **5 Claims**



1. An electromagnetic fuel injection valve comprising a fuel swirling element disposed upstream of a valve seat and having grooves for imparting a swirling motion to fuel; a fuel injection port formed downstream of said valve seat; and a ball valve for injecting the fuel, swirled by said fuel swirling element, from said fuel injection port; and in which an amount of fuel to be injected is controlled by controlling an opening and closing time period of the ball valve; wherein an area of an annular gap formed between the ball valve and the valve seat when the ball valve is lifted is smaller than a cross sectional area of the grooves of the fuel swirling element is larger than a cross sectional area of the fuel injection port.

4,887,770

ELECTROSTATIC ROTARY ATOMIZING LIQUID SPRAY COATING APPARATUS

Robert L. Wacker, Wellington; Donald E. Shuster, Elyria; John Sharpless, Oberlin; Alan J. Knobbe, Lorain, and James C. Murphy, Broadview Heights, all of Ohio, assignors to Nordson Corporation, Westlake, Ohio

Continuation-in-part of Ser. No. 14,450, Feb. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 853,746, Apr. 18, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 300,114

Int. Cl.[4] B05B *5/04*

U.S. Cl. 239—703 **47 Claims**

1. Electrostatic rotary atomizing liquid spray coating apparatus comprising:

a support body of insulative material having forward, intermediate, and rear sections,

a rotary atomizer of insulative material having an axis of rotation, a first surface over which liquid coating can flow outwardly to an atomizing edge thereof when said atomizer is rotated about said axis of rotation, and a second surface separated from said first surface by said atomizing edge,

a circular ring-shaped charging electrode mounted on said first surface encircling said axis of rotation,

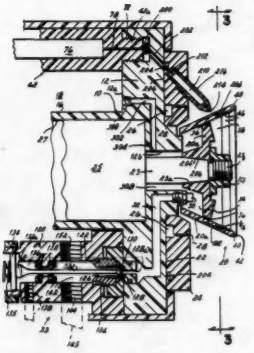
a circular electrical current-conducting element mounted on said second surface encircling said axis of rotation,

means mounted to said rotary atomizer for electrically connecting said circular electrode and said electrical current-conducting element,

drive means incorporated in said support body drivingly mounting said rotary atomizer to said forward section of said support body for rotating said rotary atomizer about said axis of rotation,

means fabricated of insulative material for supplying liquid coating to said first surface of said rotary atomizer when said atomizer is rotating about its rotational axis, and

plural circumferentially-spaced electrical conductors stationarily mounted to said forward section of said support body, said conductors having a free end located in closely spaced proximity to said circular electrical current-conducting element for transferring electrostatic energy thereto when said stationary electrical conductors are energized from a high voltage source for facilitating contact charging of liquid coating supplied to said first surface when said coating flows outwardly over said first surface in contact with said charging electrode toward said atomizing edge.

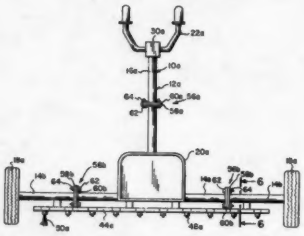


4,887,771

LIQUID CHEMICAL APPLICATOR FOR TREATMENT OF A HORIZONTAL SURFACE

Edward Marlek, 8 Northfield Dr., Ft. Salonga, N.Y. 11768

Filed Dec. 21, 1987, Ser. No. 135,361
The portion of the term of this patent subsequent to Jan. 27, 2004, has been disclaimed.
Int. Cl.[4] B05B *15/04, 15/06*
U.S. Cl. 239—722 6 Claims



1. An improved liquid chemical applicator for treatment of a horizontal surface which comprises:

(a) a pair of front wheels;

(b) a frame having an axle, an extension arm and a control handle, said axle extending between said front wheels, said extension arm rearwardly projecting transversely from center of said axle bending upwardly therefrom with said control handle at distal end of said extension arm;

(c) a first connector integral with said extension arm so that said extension arm can be disassembled and assembled when needed for storage;

(d) a pair of second connectors, each integral with said axle on either side of said extension arm so that said axle can be disassembled and assembled when needed for storage and for providing for different widths and the length of said axle can be varied by adding and subtracting different axle segment lengths to said axle;

(e) a rear wheel pivotally connected to bottom of said extension arm rearwardly of said front wheels so that mobility is increased and said rear wheel is manually steered by an operator holding onto said control handle;

(f) means for applying a uniform coating of said liquid chemical onto said horizontal surface from said applicator which is controlled by said operator, said applying means including a drum for holding said liquid chemical therein and a pump fluidly connected to said drum for removing said liquid chemical from said drum and bringing said liquid chemical to said applicator at a desired pressure and means for directing flow of said liquid chemical through said applicator and a pair of manifolds mounted along said axle each of said manifolds having a plurality of spray nozzles and means for controlling pressure of said liquid chemical fluidly connected between said directing means and said spray nozzles of said manifolds so that said spray nozzles will apply a plurality of overlapping sprays of said liquid chemical at a constant height a constant pressure and a proper angle onto said horizontal surface;

(g) a storage basket mounted to top of said extension arm between said front wheels and said rear wheel; and

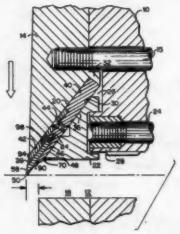
(h) a wind shield mounted onto said axle over said manifolds to help keep spray pattern constant and prevent said liquid chemical from blowing away.

4,887,772

CASSETTE KNIFE FOR CHIPPER

Mark D. Robinson, Black River, and Eugene A. Farrell, Fishers Landing, both of N.Y., assignors to Carthage Machine Co., Div. of Industrial General Corp., Carthage, N.Y.

Filed Feb. 10, 1989, Ser. No. 310,054
Int. Cl.[4] B02C *18/18*
U.S. Cl. 241—92 12 Claims



1. A chipper knife assembly for a chipper device of the type having a plurality of such knife assemblies radially disposed on a front face of a rotary disk, each blade assembly being adjacent to a chip slot that passes axially through the disk; each said knife assembly comprising at least one flat, double-edged knife blade of generally trapezoidal cross section, having a flat base surface of a predetermined breadth, a top surface spaced a predetermined distance from said base surface to define a width of the knife blade, and first and second tapered sides that slope downward from said top surface to the base defining first and second cutting edges of the blade; an elongated cassette of sufficient length to accommodate at least one said knife blade and having in cross section a proximal section, an intermediate section, and a distal section, the cassette having a flat lower surface, said proximal section having an upper surface spaced a predetermined cassette width from the lower surface; said intermediate section having a blade holder support surface recessed from said proximal section upper surface to define a shoulder at a proximal edge of the intermediate section, and a tapered surface sloping proximally partway towards said base surface from a distal edge of said blade holder support surface; and said distal section having a blade support surface on which rests the base surface of said knife blade and extending from said tapered surface to a distal edge of the cassette, and a wear surface that slopes proximally from said distal edge to said lower surface of the cassette; said blade being positioned on said blade support surface with its first tapered side facing said tapered surface and its second edge projecting beyond said distal edge of said cassette; a blade holder in the form of a laterally elongated plate having a predetermined breadth to extend from said shoulder over said blade holder support surface and continuing over a substantial portion of the upper surface of said knife blade to adjacent a distal edge of the blade

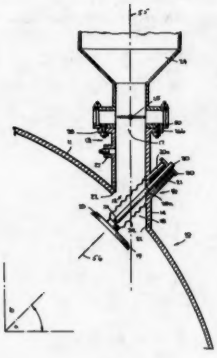
upper surface; means for clamping said blade holder in place onto said cassette with said blade sandwiched therebetween; and said blade holder being provided with a plurality of passages therethrough at a position substantially over the distal edge of said blade holder support surface to permit flowing of molten babbitt into a space between the first tapered surface of said blade and the tapered surface of said cassette.

4,887,773

ROTARY MILL WITH CHARGING SYSTEM

James C. Mehltretter, Cary, N.C., assignor to Inco Alloys International, Inc., Huntington, W. Va.

Continuation-in-part of Ser. No. 923,341, Oct. 27, 1986, abandoned. This application Jul. 21, 1988, Ser. No. 222,014
Int. Cl.[4] B03C *17/04*
U.S. Cl. 241—171 3 Claims



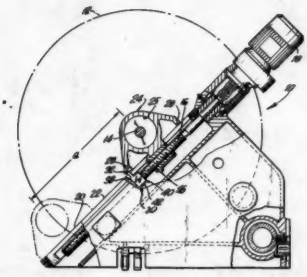
1. In combination with a controlled environment rotary mill having a shell and an aperture therethrough, an apparatus for introducing powder substantially vertically downward into the mill when the mill is stationary and for insulating the powder from the atmosphere, the apparatus comprising a loading conduit communicating with the aperture and having a side wall extending straight away from the shell, the loading conduit having a longitudinal axis the loading conduit adapted to be detachably connected to a powder source, a movable valve extending through the side wall of the loading conduit and in a sealable relationship with the aperture, the valve having an axis of symmetry, the longitudinal axis of the loading conduit and the axis of symmetry of the valve intersecting at about 45°, means for sealing the interior of the loading conduit from the atmosphere, means for rotating the mill, means for extending and retracting the valve, and positioning means for maintaining the mill in a stationary position so that the longitudinal axis of the loading conduit is substantially vertical during powder introduction.

4,887,774

SAFETY NUT ASSEMBLY FOR BACKSTAND APPARATUS

Eddie Phillips, Rt. 1 Box 361A, Rogersville, Ala. 35652; Dyle Harville, Rt. 1, Mt. Hope, Ala. 35651; Mildred Lee, Rt. 4, Box 2A, Moulton, Ala. 35650; Danny Kirby, Rt. 4, Box 246, Town Creek, Ala. 35672; Kathleen Ellison, 1011 Routon Dr., Decatur, Ala. 35601; Mary J. Smithy, 732 Cockrell Ave., Decatur, Ala. 35603; Eugene McNutt, 612 Plum Dr. SW., Decatur, Ala. 35603; Yvonne Gholston, Rt. 2, Box 95, Town Creek, Ala. 35672; Jim Brewer, 105 Holloway St., Hartselle, Ala. 35640, and Charles McClure, Rt. 7, Box 203, Florence, Ala. 35630

Filed Aug. 8, 1988, Ser. No. 229,308
Int. Cl.[4] B66B *11/04;* B65H *19/30*
U.S. Cl. 242—58.6 8 Claims



1. A safety nut assembly for mounting to a paper roll backstand apparatus, said backstand apparatus comprising an inclined rotatable screw spindle having an array of external threads thereon and a carriage having a threaded bushing securely mounted in said carriage and threadably engaged with the inclined screw spindle, said carriage comprising means for rotatably mounting a large roll of paper thereon, said safety nut assembly comprising:

a spindle mounting portion having an internally threaded spindle aperture extending entirely therethrough, said spindle aperture being characterized by an array of internal threads of slightly larger dimension than the threads of said threaded bushing such that said safety nut assembly performs no weight bearing function while said threaded bushing is engaged with said inclined screw spindle, but such that said safety nut assembly performs a weight-bearing function upon a failure of the threaded bushing; and

means for removably mounting said spindle mounting portion to said carriage, wherein said carriage of said backstand comprises a plurality of threaded apertures therein, and wherein said means for mounting said safety nut assembly to said carriage comprises a pair of mounting apertures extending through a portion of said safety nut assembly and an equal plurality of bolts dimensioned to pass through said mounting apertures and to threadably engage the threaded apertures in said carriage.

4,887,775

REEL TABLE ASSEMBLY

Masahiro Kanaguchi, and Hideo Kawamoto, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 866,409, May 23, 1986, abandoned. This application Mar. 4, 1988, Ser. No. 168,553
Claims priority, application Japan, May 23, 1985, 111182/85
Int. Cl.[4] B65H *16/10, 18/10*
U.S. Cl. 242—68.1 8 Claims

1. A reel table assembly for driving a tape reel having a center hole therein and a plurality of inwardly extending radial

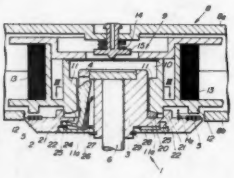
teeth formed circumferentially of the center hole, the reel table assembly comprising:

a reel table driven by a reel motor and having a reel shaft formed centrally thereof for engaging with the center hole of the tape reel when the tape reel is carried thereon;

a drive pawl provided circumferentially on said reel shaft, biasing means urging said pawl to normally project radially outwardly from said reel shaft for mesh engagement with the radial teeth of the tape reel to positively drive the tape reel, said pawl being movable radially inwardly toward the center of said reel shaft into a position in radial abutment with the radial teeth of the tape reel;

a friction member provided on an upper side of said reel table for direct contact with a lower side of the tape reel to provide a high degree of friction with the tape reel; and

projection means fixedly connected for rotation with said



reel table and having a low-friction upper surface which contacts with a lower surface of the radial teeth of the tape reel only when said drive pawl is in radial abutment with the radial teeth and has a height maintaining the tape reel lifted apart from said friction member when a radial tooth of the tape reel contacts said projection means, said projection means having a width narrower than the space between adjacent teeth of the reel center hole so as to be located between the radial teeth when said drive pawl is located between the radial teeth of the tape reel thereby allowing the reel to contact said friction member, said projection means comprising at least one projection at a position separate from said drive pawl, whereby said tape reel is engaged with said drive pawl only when said projection is in alignment with a space between adjacent teeth, said drive movable independently of said projection means.

4,887,776

FILM CASSETTE

John J. Niedospial, Jr., Rochester, and Bradley S. Bush, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 8, 1989, Ser. No. 320,441

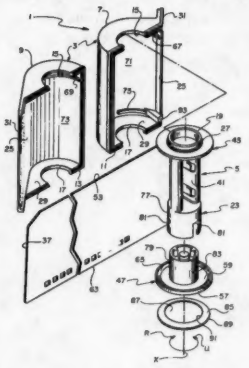
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.[4] G03B *17/26*

U.S. Cl. 242—71.1 **7 Claims**

1. An improved film cassette where (a) a spool includes two coaxial core pieces having a convoluted film roll coiled about them, whose outermost convolution is a film leader, and respective flanges fixed to said core pieces which radially extend over the opposite sides of said film roll, (b) at least one of said core pieces is supported for movement axially toward the other one to move at least one of said flanges axially toward the other one to provide axial clamping forces at the opposite sides of said film roll, and (c) a film stripper-guide is received between said outermost convolution and the next-inward convolution of said film roll to strip said outermost convolution from said flanges and guide it through a film passageway to the exterior of the cassette shell responsive to rotation of said spool in a film unwinding direction during application of said axial clamping forces, and wherein the improvement comprises:

at least one of said flanges includes integral means for con-



centrating said axial clamping forces substantially at said outermost convolution of the film roll and preventing application of the axial clamping forces substantially at the more-inward convolutions of said film roll.

4,887,777

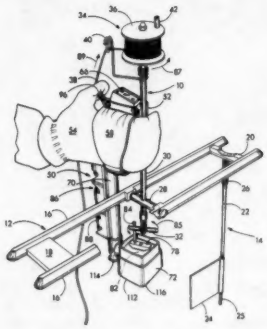
ICE FISHING REEL WINDING DEVICE

Trent T. Rasmussen, 418 Wood Ave., Nekoosa, Wis. 54457

Filed Feb. 7, 1989, Ser. No. 307,698

Int. Cl.[4] A01K *89/00*

U.S. Cl. 242—106 **11 Claims**



1. An apparatus for automatically winding fishing line onto a reel of an ice fishing device, wherein the ice fishing device comprises a support frame, an elongated tube connected to the support frame, an axle extending through the elongated tube having a first end and a second end, the first end having the reel wound with fishing line mounted thereon, and the second end comprising a rotatable trip shaft, the apparatus comprising:

(a) an elongated shaft of defined length, the shaft having a first end and a second end, wherein the first end of the shaft is defined by a hand grip;

(b) a motor mounted on the second end of the shaft, the motor comprising a rotatable drive shaft;

(c) a projecting trip shaft pin mounted on the drive shaft of the motor;

(d) a power source connected to the motor; and

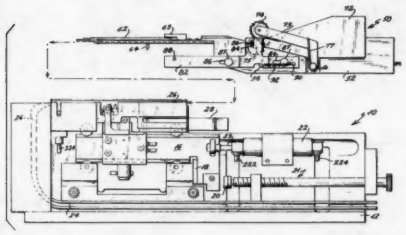
(e) means for selectively conducting power from the power source to the motor, wherein the hand grip includes means for receiving the elongated tube and positioning it such that the trip shaft at the second end of the axle is in rotatable driving engagement with the projecting trip shaft pin.

4,887,778

FEEDER DRIVE ASSEMBLY AND REPLACEABLE SECTION FOR TAPE SUPPLYING AND COVER PEELING

Henry J. Soth, Brackney, Pa., and Michael D. Snyder, Binghamton, N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Jun. 1, 1988, Ser. No. 200,953
Int. Cl.[4] B65H *20/24*
U.S. Cl. 226—109 8 Claims



1. In an apparatus having means for feeding a component supply tape step-wise so as to present components carried by said tape to a pick-up station, said apparatus having means for changing a feeding step length so as to accommodate different center-to-center distances between said components, the improvement comprising:

a fluid actuated reciprocating piston, the stroking length of which determines said feeding step length; and

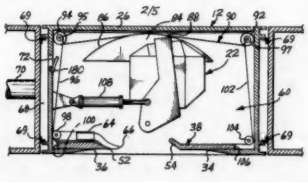
said step length changing means comprising a stop means for limiting said length of stroking.

4,887,779

ROLL DRUM SENSOR HOUSING HAVING SLIDING WINDOW

David T. Large, Everett, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 1, 1987, Ser. No. 127,491
Int. Cl.[4] B64D *47/00*
U.S. Cl. 244—1 R 14 Claims



1. An improved roll drum housing for use on board an aircraft, said housing having a hollow cavity in which is received a sensor apparatus, said housing being rotatable about a roll axis that is generally parallel to the flight path of said aircraft, wherein said sensor apparatus rolls about said axis correspondingly with drum housing rotation, said sensor apparatus further being independently pivotable in said housing about a separate azimuthal axis, the improvement comprising:

a window frame opening in a sidewall of said housing;

a window frame member slidably positioned across said opening, said frame member having a window aperture which provides said sensor apparatus with a view from inside to outside said housing;

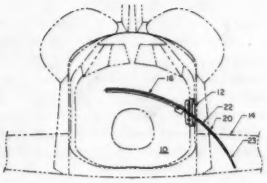
means for sliding said window frame member back and forth in a direction generally parallel to said roll axis, said sliding means being operatively connected to said sensor apparatus in a manner so that said window sliding occurs correspondingly with azimuthal pivoting of said sensor apparatus, so that said window aperture is continually positioned to permit said sensor apparatus with a view outside said housing as said apparatus changes azimuthal positions in said housing.

4,887,780

ORBITER ESCAPE POLE

Winston D. Goodrich, Houston; Clarence J. Wesselski, Alvin; Timothy E. Pelischek, League City; Bruce H. Becker, League City; Jon B. Kahn, League City, all of Tex.; Margaret E. Grimaldi, West St. Paul, Minn.; John P. McManamen, Houston, and Edgar O. Castro, Bryan, both of Tex., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 30, 1988, Ser. No. 292,046
Int. Cl.[4] B64D *25/08*
U.S. Cl. 244—137.2 22 Claims



1. In an aircraft having an escape hatch located relative to an aircraft protuberance so as to prevent a possibility of crew interference upon use the hatch, an escape device comprising:

an elongated hollow pole housing with a closed end and an open end where said open end is located adjacent to an escape hatch;

an elongated, hollow primary pole member telescopically disposed in said pole housing;

an elongated hollow extension pole member telescopically disposed in said primary pole member;

actuator means for moving said primary pole member and said extension pole member from a contracted position to an extended position;

means for actuating said actuator means for moving said primary pole member and said extension pole member from a contracted position to an extended position;

independent releasable slide members disposed on the open end of said pole housing for encircling said pole members and for selective sliding motion along said pole members when said pole members are in an extended position; and

said pole members in an extended position having sufficient length for permitting release of one of said slide members from the terminal end of said pole members so as to prevent interference with said protuberance on said aircraft.

4,887,781

TRANSMITTERS

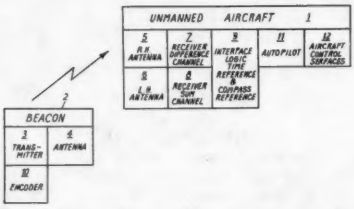
Nigel Browning, Uckfield; Arthur C. Fry, Woking; Robert L. H. Malpass, Ashford; Brian Matthews, Frimley Green, and Michael S. Peters, Wokingham, all of England, assignors to British Aerospace Public Limited Company, London, England

Continuation of Ser. No. 478,215, Mar. 24, 1983, which is a continuation of Ser. No. 210,118, Nov. 19, 1980, abandoned, which is a division of Ser. No. 926,975, Jul. 19, 1978. This application Oct. 25, 1985, Ser. No. 792,227

Claims priority, application United Kingdom, Jul. 23, 1977, 31044/77

Int. Cl.[4] B64C *13/20*

U.S. Cl. 244—190 **6 Claims**



1. A navigation system for an unmanned aircraft comprising:

a plurality of transmitters for being dropped at spaced positions in an area incorporating a desired flight path, each transmitter being operable to transmit a signal to be received by said aircraft, each transmitter including

a body portion,

an antenna fitted to said body portion, the antenna comprising two dipoles at right angles to each other and aerodynamically shaped to assist in the proper orientation of the transmitter during free fall, and

stabilising means arranged to be operative on impact of the transmitter with the ground so as to stabilise the antenna in an upright position;

receiver means, mounted in said aircraft, for receiving said signals; and

an autopilot, mounted in said aircraft, for controlling, responsive to said signals received by said receiver means, aircraft control surfaces for navigating said aircraft in accordance with said signals.

4,887,782

CYCLIC CONTROL STICKS FOR HELICOPTERS

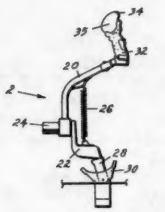
Brian L. Carnell, Rocky Hill; John D. Fansler, Oxford, and Mukunda B. Pramanik, Burlington, all of Conn., assignors to The United States of American as represented by the Secretary of the Army, Washington, D.C.

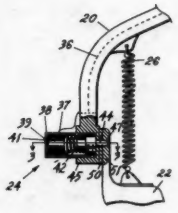
Filed Jan. 12, 1989, Ser. No. 298,073

Int. Cl.[4] B64C *13/04*

U.S. Cl. 244—234 **7 Claims**

1. A helicopter cyclic control stick capable of controlling the pitch of a helicopter rotor blade for reducing injuries caused by pilot impact with his cyclic stick on hard emergency or crash landings, comprising an upper control stick portion and a lower control stick portion, a hand grip on one end of the upper control stick portion, pivotal fittings on one end of the lower control stick portion connecting the control stick to cyclic pitch control mechanisms of the helicopter to allow for pilot imposed cyclic pitch motion changes, attachment means connecting one end of the upper control stick portion to one end of the lower control stick portion, release means associated with the attachment means, the release means when actuated, being capable of completely disconnecting the upper control stick portion from the lower control stick portion at the point where the attachment means join one end of each portion, pretensioned spring means having one end attached to a point on the upper control stick portion and the other end attached to a point on the lower control stick portion, the spring being biased to yank the upper control stick portion away from the pilot when the release means are actuated preventing the pilot





from being injured by the control stick, a pressure sensitive switch disposed in the hand grip, and means actuated by the pressure sensitive switch for actuating the release means.

4,887,783

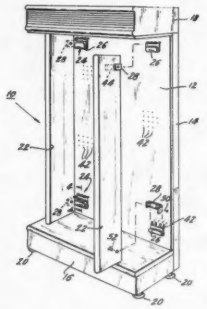
T-DIVIDER BRACKET ASSEMBLY

Robert P. Franklin, Lake Hopatcong, N.J., assignor to Trans-World Marketing Corporation, East Rutherford, N.J.

Continuation of Ser. No. 141,048, Jan. 5, 1988, abandoned. This application Mar. 20, 1989, Ser. No. 327,417

Int. Cl.[4] A47F *7/00*

U.S. Cl. 248—220.4 **18 Claims**



1. A bracket assembly coupling a bay divider wall to a generally planar peg board wall, said bracket assembly comprising:

(A) a peg board wall bracket including:

(1) an elongated U-shaped channel having a closed bottom and an open top; and

(2) peg means coupling said wall bracket to apertures in said peg board wall such that said U-shaped channel

extends horizontally and parallel to said peg board wall and said open top faces upwardly; and

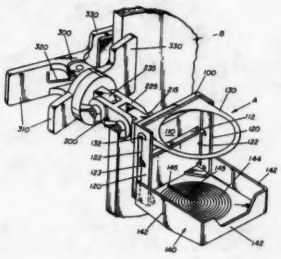
(B) means supporting said bay divider, said bay divider supporting means comprising a single piece right angled divider wall bracket having first and second arms extending at right angles to one another, one of said arms being secured to the bay divider wall, the remaining of said arms being inserted into said open top of said wall bracket and held within said U-shaped channel by the force of gravity and extending horizontally on its side therein.

4,887,784

ADJUSTABLE DRINK HOLDER

Nabil A. Kayali, Houston, Tex., assignor to NK Innovations, Inc., Houston, Tex.

Filed Mar. 2, 1989, Ser. No. 317,964
Int. Cl.[4] A47K *1/09*
U.S. Cl. 248—311.2 **13 Claims**



1. An apparatus for holding a beverage container, comprising:

a frame;

a base pivotably connected to the frame near a lower end of the frame to pivot between a position parallel to the frame and a position perpendicular to the frame;

a hoop pivotably connected to the frame above the base to pivot between a position parallel to the frame and a position perpendicular to the frame;

four separate rotational means connected in a series arrangement, one of which is connected to the frame for adjusting the frame's position relative to four separate axes of rotation;

three longitudinal link elements in an end-to-end relationship connecting the rotational means together;

an attachment means connected to one of the four rotation means, for releasably attaching the apparatus directly to a selected surface of the environment;

wherein the frame can be positioned vertically at different selected heights for any selected orientation of the attachment means.

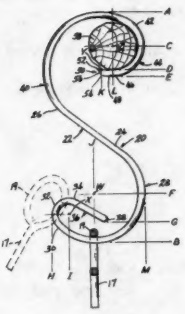
4,887,785

HANGER HOOK

Ilga E. Blaich, 17 Pond Hollow, Hamden, Conn. 06518

Filed Aug. 19, 1988, Ser. No. 233,809
Int. Cl.[4] F16B *45/00*
U.S. Cl. 248—339 **13 Claims**

13. A hanger hook according to claim 3 wherein said straight central portion has a length of about 3 inches (7.6 cm), the inside diameter of said lower main arcuate portion is about 3.75 inches (9.5 cm) and its arcuate extent is about 193 degrees, the inside diameter of said lower auxiliary arcuate portion is about 0.875 inch (2.2 cm) and its arcuate extent is about 160 degrees, the inside diameter of said upper main arcuate portion



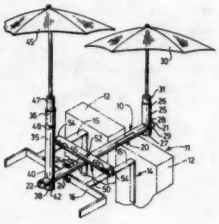
is about 4.25 inches (10.8 cm) and its arcuate extent is about 180 degrees.

4,887,786

PORTABLE DUAL UMBRELLA HOLDER

R. W. Stokes, Box 784, Mackinaw, Ill. 61755

Filed Mar. 23, 1988, Ser. No. 172,253
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—512 **6 Claims**



1. A dual umbrella holder for golf carts having spaced seat and golf bag mounting sections, the seat section including a pair of seat back support frames and the golf bag mounting section including a bag support frame integral with the seat back support frames, said holder comprising:

an elongated main support member mountable on the cart in bridging relation between said seat and golf bag mounting sections;

a first upstanding umbrella receiving member mountable on said main support member and being of a predetermined length to support an umbrella above said seat section;

a second upstanding umbrella receiving member mountable on said main support member and being of a longer length than said first receiving member to support a second umbrella on the cart above said bag mounting section in a higher elevational position than said first umbrella;

quick-disconnect means on said main support member for releasably mounting said holder on the cart, said quick-disconnect means comprising

a hook bolt mounted on said main support member which is releasably engageable with said bag support frame, and a cross support member pivotally mounted on said main support member in longitudinally spaced relation to said hook bolt for movement to a position perpendicularly disposed relative to said main support member in bridging engagement between said set back support frames.

4,887,787

MEANS FOR MOUNTING HARDWARE OR FITTINGS, ESPECIALLY SHELVES AND HOLDERS

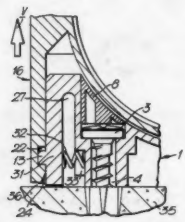
Bernd Friedrichs, Arolsen, Fed. Rep. of Germany, assignor to Hewi Heinrich Wilke GmbH, Fed. Rep. of Germany

Filed Oct. 27, 1988, Ser. No. 263,175

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 8714446

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—551 16 Claims



1. Mounting means on hardware or fittings comprising at least one base part with a bearing surface for fastening to a wall or the like, and a cover part which can be pressed onto the base part and covers the same completely in the installed state, first fastening means associated with the fully installed state of the cover part and preventing in an assembled state even partial unintentional removal, but in a separated state permitting complete removal, of the cover part from the base part; and second fastening means which in assembled state permit partial withdrawal but in separated state permit a complete withdrawal of the cover part from the base part and which are accessible only when the cover part is in at least partially withdrawn state after release of the first fastening means.

4,887,788

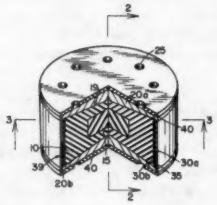
BASE ISOLATION PAD

Richard J. Fischer, Golden, and Douglas J. Swanson, Castle Rock, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed Jan. 15, 1988, Ser. No. 144,844

Int. Cl.[4] F16F *5/00*

U.S. Cl. 248—562 15 Claims



1. A device for absorbing energy adapted to be positioned between two members which may vibrate or oscillate relative to one another due to forces applied to either one or both of the two members, which comprises:

a first end piece engageable to one of the two members;

a second end piece engageable to the other one of the two members;

an energy absorbing means interposed between the first and second end pieces, said energy absorbing means having a substantially viscous inner section encapsulated by a resilient elastomeric section;

means for securing said energy absorbing means to each of the first and second end pieces; and

a flexible reinforced tubular restraining shell surrounding said energy absorbing means and extending at least partially between the first and second end pieces, said restraining shell comprising a helical tensile load carrying member extending substantially the full height of said restraining shell, said restraining shell in conjunction with said energy absorbing means capable of functioning as a support.

4,887,789

FORM FOR MOLDING COLUMNS

Frank R. Harris, 18922 Crest Ave., Castro Valley, Calif. 94546, and Robert D. Young, 107 Reservoir Rd., Atherton, Calif. 94025

Filed Apr. 26, 1988, Ser. No. 186,513

Int. Cl.[4] E04G *13/02*

U.S. Cl. 249—16 9 Claims

1. A form for casting a building component of desired size, shape and surface features from castable material comprising:

a plastic material having an open interior volume of the desired size, shape and surface features, the interior volume being defined by the plastic material extending from an exterior surface to an interior surface defining the interior volume, directly against which the castable material is disposed without an intervening layer, the exterior surface receiving supporting means for maintaining the form in a desired position;

supporting means for maintaining the form in the desired position, which comprises a plurality of supporting members, and the exterior surface of the plastic material includes a corresponding plurality of channels receiving the supporting members;

at least one tightenable band surrounding the exterior surface of the plastic material and the supporting members;

means for tightening the tightenable band; and

retaining pads disposed between the tightenable band and the supporting members.

4,887,790

TROCHE MOLD AND DISPENSER

William R. Wilkinson; Marion G. Webber, both of Houston, and Dean J. King, Sugar Land, all of Tex., assignors to Professional Compounding Centers of America, Inc., Sugarland, Tex.

Continuation of Ser. No. 70,394, Jul. 7, 1987, abandoned. This application Jul. 22, 1988, Ser. No. 223,705

Int. Cl.[4] A61J *3/06*

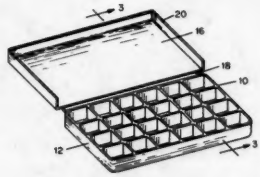
U.S. Cl. 249—52 4 Claims

1. A combination medication mold and dispenser comprising

a flexible, bendable molded plastic multicompartment tray of a grid matrix with compartments formed by intersecting flexible walls with each compartment sized for an oral medicine troche and said tray made of a plastic capable of receiving a warm liquid poured into the compartments for molding into a solid troche with the bottom of each com-

partment having a small linear protrusion to produce an indentation to score the troche;

a cover for said multicompartment tray; and



a flexible hinge connecting said multicompartment tray and said cover to open and close to protect the contents of said tray.

4,887,791

MOULDS FOR GLASS MAKING AND USE THEREOF

Celia M. Tangari, Rio de Janeiro, Brazil; Alain Dugast, Paris, and Daniel Abriou, Gagny, both of France, assignors to Saint-Gobain Emballage, Courbevoie, France

PCT No. PCT/FR87/00492, § 371 Date Aug. 3, 1988, § 102(e) Date Aug. 3, 1988, PCT Pub. No. WO88/04283, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 10, 1987, Ser. No. 246,670

Claims priority, application France, Dec. 12, 1986, 86 17395

Int. Cl.[4] B28D *7/36*; B44D *1/20*

U.S. Cl. 249—115 **13 Claims**

1. A mold of cast iron for production of receptacles of glass by the mold-blowing or blow-blowing method, in which the parts exposed to the parison are coated with a uniform layer of alumina of which the thickness is at least 1.0 micrometer and is less than 5 micrometers, which is of sufficient regularity to resist the diffusion of sodium from the glass into the cast iron.

4,887,792

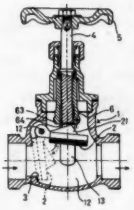
STOP-CHECK VALVE

Ping-Song Kuo, No. 82, Tung Cheng Street, Tainan, Taiwan

Filed Oct. 6, 1988, Ser. No. 254,364

Int. Cl.[4] F16K *31/44*

U.S. Cl. 251—82 **4 Claims**



1. A stop-check valve, comprising a valve body, a swing-type check valve disc mounted in said body and having an inlet side and an outlet side, a contacting projection formed on said outlet side of said valve disc, a rotatable and axially fixed valve rod positioned in said body generally perpendicular to a flow path of fluid through said valve, one end of said valve rod having an axially fixed handwheel attached thereto, another end of said valve rod being threaded and positioned proximate said outlet side of said valve disc, and a contact portion threadedly coupled with said threaded end of said rod, and interengaging means on said valve body and said contact portion for preventing rotation of said contact portion, and said contact portion being axially movable along said rod upon rotation of said rod for operatively engaging said contacting projection.

4,887,793

DISK COMPRISING AT LEAST ONE OPENING AND TAP COMPRISING SAID DISK

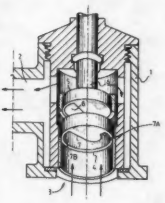
Michel Hernandez, Aulnay Sous Bois; Patrice Herve, and Yves Gougouyan, both of Paris, all of France, assignors to C.I.C.E. S.A. of Les Miroirs, Paris, France

Filed Jun. 8, 1988, Ser. No. 204,125

Claims priority, application France, Jun. 17, 1987, 87 08466

Int. Cl.[4] F16K *5/10, 41, 06*

U.S. Cl. 251—208 **13 Claims**



7. Tap for liquids comprising a cylindrical hollow body, a liquid inlet in said body, a liquid outlet in said body, a fixed disk of substantially circular shape comprising a single opening for liquid to pass through disposed in said body between said liquid inlet and said liquid outlet, a rotary disk comprising a single opening disposed in contact with said fixed disk and between said fixed disk and said liquid outlet, and an operating rod adapted to rotate said rotary disk relative to said fixed disk on more than 180° between a closed configuration in which each disk closes off said disk and an open configuration in which said openings in said disks are at least partially superposed, in which tap said opening in said fixed disk has an elongate shape which widens gradually from a relatively narrow first end to a relatively wide second end which is angularly offset relative to said first end by more than 180° but less than 270°, said second end being radially delimited externally by a circular arc concentric with said fixed disk and internally by an approximately radial straight line segment defining, with said circular arc, an annular sector defining an open area facing an interior portion of said opening, the sum of the angular amplitudes of the openings in said two disks being less than 360 °.

4,887,794

BALL VALVE

John P. Oliver, Houston, and Thomas F. Bright, Conroe, both of Tex., assignors to Mogas Industries, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 236,597, Aug. 25, 1988, abandoned. This application Nov. 2, 1988, Ser. No. 266,001

Int. Cl.[4] F16K *5/06*

U.S. Cl. 251—315 **10 Claims**

1. A ball valve, comprising

a valve body having a flowway therethrough including a cavity therein intermediate its ends,

a ball closure having a port therethrough and rotatable within the cavity to open and close the flowway,

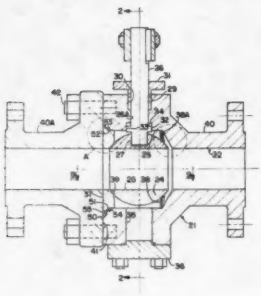
a seat ring within the cavity on one side of the ball closure, means yieldably urging the ball closure against the seat ring,

said body having a main portion with the cavity formed therein and opening to one end, to permit the ball closure, seat ring and urging means to be moved therethrough into and out of the cavity, and an end portion having an end face releasably connected to the end of the main body portion to hold the seat ring against the ball closure and thus the ball closure against the urging means,

a stem rotatably mounted in the main body portion and having a tongue and groove connection with the ball closure for rotating the ball closure between open and closed positions while permitting the ball closure to move axially when in its closed position,

said seat ring having an outer circumference which is closely received within the end opening in the cavity and an outer end which is tightly engaged by the end face of the end portion of the body, and

resilient sealing means which is confined between and compressed into sealing engagement with the seat ring and the



body and confined between and compressed into sealing engagement with the body portions, as the end portion of the body is connected to the main portion thereof, so as to prevent line fluid from passing between the end face of the end portion of the body and the end of the main body portion as well as prevent line fluid from bypassing the ball closure in its closed position,

the outer circumference of said seat ring and the end opening in the body cavity having oppositely facing shoulders which limit axial inward movement of the seat ring to maintain said sealing means compressed into sealing engagement.

4,887,795

OPEN-CELLED, ELECTRICALLY CONDUCTIVE CERAMIC NETWORK

Joseph Nemeth, Harsens Island, and Charles I. Kowalski, Mount Clemens, both of Mich., assignors to Champion Spark Plug Company, Toledo, Ohio

Continuation of Ser. No. 455,416, Jan. 3, 1983, abandoned. This application May 20, 1986, Ser. No. 867,895

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 **1 Claim**

1. An article comprising, in combination, means forming a body of a vitrified ceramic material having interconnected voids distributed therethrough which are effective to make it pervious, and means operatively associated therewith and effective to impart thereto a resistivity of from 4×10^{1} to 4×10^{7} ohms-inch without imparting excessive friability thereto, said ceramic material constituting from 15 percent to 30 percent by volume of said body and the voids constituting the remainder of the volume thereof.

4,887,796

BARBED TAPE

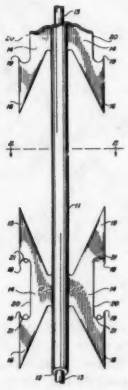
Renne A. Cano; Don W. Boness, both of Phoenix, Ariz.; Robert W. Major, Seymour, Conn., and Gabriel A. Valdez, Tolleson, Ariz., assignors to American Fence Company, Phoenix, Ariz.

Filed Nov. 30, 1987, Ser. No. 126,821

Int. Cl.[4] B21F *25/00*

U.S. Cl. 256—8 **7 Claims**

1. A barbed tape of an elongated metal strip comprising a central portion, a plurality of barb pairs, a root portion joining each one of said barb pairs to said central portion, each of said barb pairs including a first barb and a second barb, said first and second barbs extending in opposite directions away from each other, each of said barb pairs having a second pair of barbs



formed therefrom, each one of said second pair of barbs including a third barb and a fourth barb, and said third and fourth barbs extend in opposite directions toward each other to define a cutout region between said third and fourth barbs in said barb pairs.

4,887,797

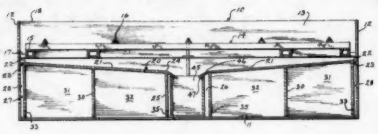
SLAG FLUSHING AND WATER LEVEL CONTROL SYSTEM FOR A METAL CUTTING APPARATUS

Gerald D. Karow, Bayside, Wis., assignor to Messer Griesheim Industries, Inc., Valley Forge, Pa.

Filed Dec. 5, 1988, Ser. No. 279,543

Int. Cl.[4] B23K *7/08*

U.S. Cl. 266—49 **14 Claims**



1. An improved slag flushing and water level control system for the burn table of a metal cutting apparatus comprising:

a burn tank disposed below the metal cutting apparatus;

said burn tank having a bottom and an enclosing side wall effective to retain a varying volume of water at selected levels;

a downwardly sloping intermediate floor portion in said tank disposed to receive metal slag from the burn table and having a lower edge terminating above the tank bottom and an upper edge terminating below the maximum selected water level;

a first enclosed water chamber below said intermediate floor portion having a first water passage disposed near the bottom thereof and a first gas opening disposed above said first water passage;

said first water passage having an open connection to the upper edge of said floor portion;

said first gas opening having a fluid connection to a source of pressurized gas;

a second enclosed water chamber below said intermediate floor portion having a second water passage disposed near

the bottom thereof and a second gas opening disposed above said second water passage;

said second water passage having an open connection to the lower edge of said floor portion;

said second gas opening having a fluid connection to said source of pressurized gas;

control means for directing gas from said source to said first gas opening to pressurize said first chamber and force the water therefrom over the upper edge of said floor portion; and

said control means being further operative for directing gas from said source to said second gas opening to pressurize said second chamber and force the water therefrom into said tank to raise the water to a selected level.

4,887,798

DEVICE FOR DETECTING SLAG FLOWING WITH MOLTEN METAL THROUGH AN OUTLET OPENING IN A METALLURGICAL VESSEL

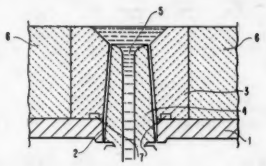
Edmund Julius, Aachen, Fed. Rep. of Germany, assignor to AMEPA Angewandte Messtechnik und Prozessautomatisierung GmbH, Aachen, Fed. Rep. of Germany

Filed Jul. 5, 1988, Ser. No. 215,582

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722795

Int. Cl.[4] C21B *7/24*

U.S. Cl. 266—99 **16 Claims**



1. In a device for detecting slag flowing with a stream of molten metal discharged through an outlet opening in a metallurgical vessel, said device including a sensor for sensing slag in the stream of molten metal to be positioned in the area of a metal base plate of the metallurgical vessel and to surround the discharged stream of molten metal without being in contact therewith, said sensor having at least one sending coil and at least one receiving coil associated with a reference coil, the improvement wherein:

at least said sending and receiving coils extend concentrically within a housing formed of a non-magnetic material, said housing encompassing said coils and defining therearound a protective casing that is resistant to mechanical stresses, and

said housing includes means for preventing the metal plate from adversely affecting the sensing of the slag in the molten metal when the device is positioned in the area of the metal base plate of the vessel, said means comprising

one of a shield shielding the reference coil from an electromagnetic field emanating from the stream of molten metal while exposing the reference coil to an electromagnetic field emanating from the metal plate, and a shield shielding the metal plate from high frequency signals issued by the sending coil while allowing low frequency signals issuing from the sending coil to penetrate the metal plate.

4,887,799

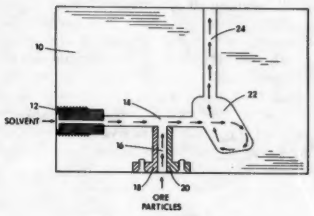
APPARATUS FOR TREATMENT OF ORE PARTICLES

Kenneth G. Parrent, Golden, Colo., assignor to Richard J. Moser, Lakewood, Colo.

Filed Feb. 10, 1986, Ser. No. 827,647

Int. Cl.[4] C22B *3/02*

U.S. Cl. 266—168 **6 Claims**



1. An apparatus for treatment of ore particles by solvent, comprising:

(a) A nozzle to produce a high-pressure jet of solvent;

(b) A passage extending axially from said nozzle;

(c) An inlet port allowing ore particles to be introduced into said passage;

(d) A mixing chamber at the end of the passage opposite from the nozzle.

4,887,800

TUYERE OF BLAST FURNACE

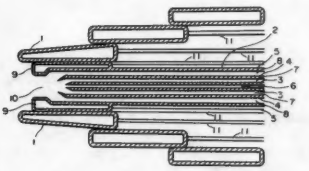
Hirohisa Hotta; Yotaro Ono, and Masahiro Matsuura, all of Tokyo, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,602

Claims priority, application Japan, Jan. 9, 1987, 62-1856

Int. Cl.[4] C21C *5/48*

U.S. Cl. 266—270 **4 Claims**



1. Apparatus for blowing pulverized coal into a blast furnace, comprising:

a water-cooled tuyere having a water-cooled jacket means for containing cooling water;

burner means removably mounted inside of a receiving space of said water-cooled jacket means of said water-cooled tuyere for burning pulverized coal, said burner means having an outlet end having an outlet opening;

said burner means including:

an inner feed pipe, an intermediate pipe and an outer pipe which are all concentrically arranged so as to form concentric spaced apart circles in cross section;

said inner feed pipe having an inner space defining an inner feed path for feeding said pulverized coal;

an intermediate feed path for feeding oxygen being defined by a space formed between said inner feed pipe and said intermediate pipe; and

an outer feed path for feeding tuyere nose flame temperature control gas being defined by a space between said intermediate pipe and said outer pipe;

said outlet opening of said burner means including a jetting-out opening at said outlet end of said burner means, in communication with said feed paths, for mixing said pulverized coal with said oxygen gas and said tuyere nose temperature control gas; and

said burner means including a water-cooled jacket means arranged at least around the outside of said outlet end of said burner means and inside of and adjacent to said water-cooled jacket means of said water-cooled tuyere so as to provide an overlapped structure, for cooling said outlet end of said burner means, said water-cooled jacket means of said burner means being substantially completely overlapped with and independent of said water-cooled jacket means of said water-cooled tuyere when said burner means is in said receiving space of said water-cooled jacket means, and said burner means and its water-cooled jacket means being slidably removable as a unit from said receiving space of said water-cooled jacket means of said water-cooled tuyere.

4,887,801

HYDRAULICALLY DAMPED ELASTOMER-METAL BEARING

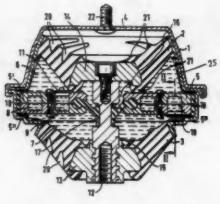
Franz J. Wolf, and Hubert Pletsch, both of Bad Soden-Salmünster, Fed. Rep. of Germany, assignors to WOCO Franz-Josef Wolf & Co., Fed. Rep. of Germany

Filed Nov. 2, 1988, Ser. No. 265,897

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3737252

Int. Cl.[4] F16F 5/00

U.S. Cl. 267—140.1 **20 Claims**



1. A hydraulically damped bearing comprising:

a housing having a bottom portion and an inner surface and including a centrally located and axially extending first load coupling element for supporting a load;

an inner disc-type elastomer support spring positioned at least partially within said housing and having a truncated conical cross-section defining inner and outer concave surfaces;

an outer disc-type elastomer support spring positioned at least partially within said housing and having a truncated conical cross-section defining inner and outer concave surfaces, said inner support spring and said outer support spring being coaxial with respect to one another and being positioned with respect to said housing such that the inner concave surface of said inner support spring and the inner concave surface of said outer support spring both face towards the bottom of said housing; and

a disc-type separating element attached to the inner surface of said housing in a liquid-tight manner, said separating element being positioned between said inner and outer support springs to thereby define a first working chamber between the inner concave surface of said outer support spring and the separating element and a second working chamber between the outer concave surface of said inner support spring and the separating element, said first and second working chambers being filled with a damping liquid, said outer support spring having a centrally located and axially extending second load coupling element attached thereto, said separating element having two separate channels located therein, each of the channels being adapted to be communicated with said first and second working chambers and each of the channels having a back valve positioned therein, the back valve in each channel being openable in different directions and each back valve being separately closable whereby, when the bearing is loaded, the damping liquid is forced from the first working chamber to the second working chamber as a result of an increase in pressure in the first working chamber which presses the damping liquid through one of the channels to thereby open the back valve associated with that channel, and when the bearing is unloaded, the damping liquid is forced from the second working chamber to the first working chamber as a result of an increase in pressure in the second working chamber which presses the damping liquid through the other channel to thereby open the back valve associated with that channel.

4,887,802

LEAF SPRING ASSEMBLIES

Lester T. Wilcox, Wolverhampton, United Kingdom, assignor to GKN Technology Limited, West Midlands, England

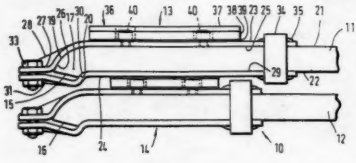
PCT No. PCT/GB87/00372, § 371 Date Sep. 12, 1988, § 102(e) Date Sep. 12, 1988, PCT Pub. No. WO87/07226, PCT Pub. Date Dec. 3, 1987

PCT Filed May 29, 1987, Ser. No. 246,301

Claims priority, application United Kingdom, May 31, 1986, 8613262; Jul. 17, 1986, 8617506

Int. Cl.[4] F16F 1/36

U.S. Cl. 267—148 **7 Claims**



1. A spring comprising an elongate leaf made of fibre-reinforced plastics material and having a free end;

the spring having, adjacent the free end, a portion affording oppositely facing generally flat surfaces extending lengthwise of the spring, and at the free end a portion which is curved relative to the adjacent portion of the spring to afford concave and convex surfaces as continuations of the generally flat oppositely facing surfaces;

a first member extending lengthwise of the spring along and in face-to-face engagement with one of the oppositely facing generally flat surfaces and one of the concave and convex surfaces of the spring, and extending beyond the free end of the spring;

a second member extending lengthwise of the spring along and in face-to-face engagement with the other of the oppositely facing generally flat surfaces and the other of the concave and convex surfaces of the spring, and extending beyond the free end thereof;

fastening means securing the first and second members together at a position beyond the free end of the spring;

a fastening element comprising a metal loop extending around both the first and second members and with a portion of the spring therebetween, at a position spaced lengthwise of the spring from the free end thereof, the first and second members having retention formations and the loop being deformed into engagement with the retention formations to prevent displacement of the loop therefrom; and

at least one of the first and second members being provided, between the fastening means beyond the free end of the

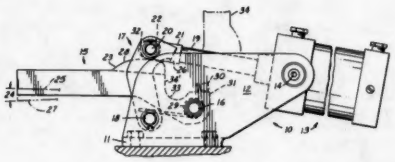
spring and the fastening element metal loop, with a wear-resistant bearing surface for sliding engagement.

4,887,803

POWER ACTUATED CAM CLAMP

Larry M. Witt, 53260 Bellamine, Rochester, Mich. 48064

Filed Jan. 9, 1989, Ser. No. 294,824
Int. Cl.[4] B23Q *3/08*
U.S. Cl. 269—32 6 Claims



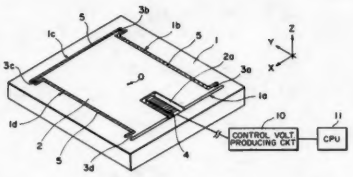
1. Power actuated cam clamp comprising a clamp base with means for mounting on a support surface, said base including side flanges for pivotal mounting of clamp elements therbetween, said elements icnluding pivotally mounted clamp arm with dual laterally spaced cam surface means, single pivot mounted dual side links laterally spaced outside of said dual cam surface means mounting cam surface engaging actuating linkage rollers, and pivotally mounted power cylinder with direct piston rod actuating connection to said linkage.

4,887,804

STAGE MECHANISM

Masaru Ohtsuka, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 25, 1987, Ser. No. 125,552
Claims priority, application Japan, Dec. 2, 1986, 61-287072
Int. Cl.[4] G01B *5/00*
U.S. Cl. 269—73 11 Claims



1. A stage mechanism, comprising:

a reference portion;

a stage portion displaceably supported by said reference portion;

a drive source for displacing in a predetermined direction said stage portion relative to said reference portion; and

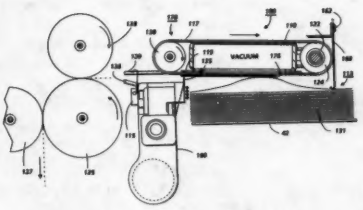
a vibration attenuating member provided between said reference portion and said stage portion for attenuating vibration caused when said stage portion is displaced by said drive source relative to said reference portion.

4,887,805

TOP VACUUM CORRUGATION FEEDER

Glenn M. Herbert, Rochester; Charles S. Kneisel, Farmington; Russell McDonald, Rochester; Raymond A. Povio, Pittsford, and Michele D. Zirilli, Walworth, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 10, 1988, Ser. No. 166,281
Int. Cl.[4] B65H *3/12*
U.S. Cl. 271—94 4 Claims



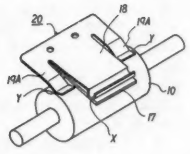
1. In a top sheet feeding apparatus comprising a sheet stack support tray, feedhead means including a vacuum chamber positioned over the front of a stack of sheets when sheets are placed in the tray with the vacuum chamber having a negative pressure applied thereto at all times during a feed cycle, said vacuum chamber having a sheet corrugation means mounted in about the center of its bottom surface and perforated knurled feed belts associated with said vacuum chamber to transport the sheets acquired by said vacuum chamber in a forward direction out of the stack support tray; air knife means positioned immediately adjacent the front of said stack of sheets for applying a positive pressure to the sheet stack in order to separate the upper-most sheet from the rest of the stack, said air knife means including trapezoidal shaped pre-separation fluffer jets, converging slot jets, and fang gate means adapted to prevent multifeeding of sheets from the sheet stack, rotational damper means for controlling leakage from the stack sides in order to minimize sheet flutter and improve curled sheet feeding; the improvement characterized by belt coast control means for controlling the precise stopping position of said vacuum belt means in order to minimize multifeeding of sheets from the stack; and wherein said vacuum chamber includes static electricity dissipation means.

4,887,806

PAPER TRANSPORT SYSTEM FOR APPARATUS INCLUDING FACSMILE AND PHOTOCOPYING MACHINES

Hironori Tanaka, and Hiroshi Shirakoshi, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 23, 1988, Ser. No. 159,106
Claims priority, application Japan, Feb. 23, 1987, 62-25946
Int. Cl.[4] B65H *3/52, 1/06*
U.S. Cl. 271—121 6 Claims



1. A paper transport system including a facsimile machine and copying machine, having a paper transport passage, comprising:

a paper feed roller located at the upstream end of said transport passage;

a resilient, flexible separation plate located adjacent said paper feed roller and having a distal end portion contactable with said feed roller;

a separation spring biasing said end portion of said separation plate against said feed roller;

a pair of paper feed springs located on either side of said separation plate and said separation spring and having respective distal end portions contactable with said feed roller upstream of a contact line between said separation plate and said feed roller; and

a paper guide plate located upstream of said paper feed roller adjacent a paper supply and wherein said pair of paper feed springs and said separation spring comprise integral portions of a common spring leaf member attached to said guide plate.

4,887,807

SIDE-LIMIT STOP FOR A DEVICE FOR SEPARATING OF PAPER PIECES FROM A STACK

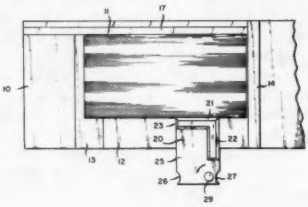
Erwin Berger, Thörishaus, and Christian Moy, Kriechenwil, both of Switzerland, assignors to Hasler AG, Bern, Switzerland

Filed Dec. 24, 1987, Ser. No. 162,297

Claims priority, application Switzerland, Apr. 24, 1986, 1669/86

Int. Cl.[4] B65H *1/00*

U.S. Cl. 271—171 **19 Claims**



1. An apparatus for separating of paper pieces from a stack of paper pieces comprising

a flat feed table for carrying said stack, which table determines a horizontal plane;

a vertical side guidewall on a rear side of said feed table,

a side-limit stop on a front side of said feed table opposite to the rear side, said side-limit stop and said guidewall together bounding said stack, said side-limit stop comprising

a support bolt horizontally slidably supported beneath the feed table in the direction from the said rear side to the said front side;

a support block mounted at one end of said a support bolt rotatably around the axis of the bolt;

a pin supported on said support block directed perpendicular to the direction of said support bolt;

a carrier supported on said pin and comprising a first limit stop surface on a first side and a second limit stop surface on a second side; such that between said carrier and said feed table there are possible three different predetermined positions,

at the first of said three positions said carrier is placed above said feed table and said first limit stop surface lies parallel to said side guidewall;

at the second of said three positions said carrier is placed beside said feed table and said second limit stop surface lies parallel to said side guidewall and a wall of said support block flushes with said horizontal plane of said feed table; and

at the third of said three positions said carrier is placed beside said feed table and said second limit stop surface flushes with said horizontal plane of said feed table.

4,887,808

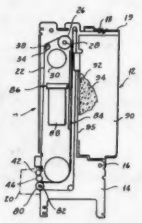
COMPACT BILL ACCEPTOR

Donald A. Dekker, Grand Rapids, and Lawrence Zandstra, Rockford, both of Mich., assignors to Rowe International, Inc., Whippany, N.J.

Filed Jun. 20, 1988, Ser. No. 209,418

Int. Cl.[4] B65H *29/46*

U.S. Cl. 271—181 **11 Claims**



1. A bill acceptor for receiving and storing a plurality of bills deposited therein including in combination, a frame, a bill box having a front opening through which bills can be introduced into the box, means mounting said box on said frame for movement between an active position at which it can receive bills through said opening and an inactive position, a ram, means mounting said ram on said frame with said box in said active position for movement from a retracted condition at which a bill can be positioned between said ram and said opening and an advanced position at which it moves a positioned bill into said box, means on said frame forming a mouth into which bills can be inserted, means for moving a bill inserted into said mouth along a transport path to a position between said ram and said opening, drive means on said frame for moving said ram from said retracted position to said advanced position to move said bill in said position into said bill box, said ram mounting means comprising a slide, a first lost motion connection between said slide and said ram and a second lost motion connection between said slide and said frame.

4,887,809

ENDLESS REVOLVING TRANSPORT APPARATUS FOR PIECE GOODS

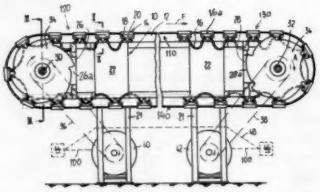
Jürg Eberle, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Sep. 28, 1988, Ser. No. 250,404

Claims priority, application Switzerland, Oct. 2, 1987, 3854/87

Int. Cl.[4] B65H *29/04*

U.S. Cl. 271—203 **13 Claims**



1. An endless revolving piece good-transport apparatus, especially for printed products, comprising:

guide means for guiding entrainment elements;

a plurality of entrainment elements mounted for revolving movement in said guide means;

connection means providing drag connections for intercoupling said entrainment elements with one another;

said entrainment elements moving through a conveying-active path along said guide means in a predetermined direction of movement;

said conveying-active path having a starting region and a terminal region;

said entrainment elements taking over the infed piece goods at a product take-over operating cadence at said starting region of said conveying-active path;

said entrainment elements delivering the piece goods at a product delivery operating cadence at the terminal region of said conveying-active path;

respective drive means for driving said entrainment elements at said starting region and at said terminal region of said conveying-active path and for controlling the mutual position of said entrainment elements with respect to one another in order to regulate the product take-over operating cadence independent of the product delivery operating cadence from one another; and

said connection means providing said drag connections between the entrainment elements comprising resilient means which can be shortened and extended.

4,887,810

DEVICE FOR CONVEYING AND ALIGNING SHEETS IN SHEET-PROCESSING MACHINES

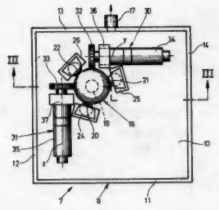
Bertold Grützmacher, Schriesheim, and Theodor Blaser, Dielheim, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Mar. 28, 1988, Ser. No. 174,088

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710259; Feb. 13, 1988, 3804576

Int. Cl.[4] B65H *9/00*

U.S. Cl. 271—225 **18 Claims**



1. Device for conveying and aligning a sheet in a sheet-processing machine, with at least one frictionally driven ball having a dome facing towards the sheet for engaging a broad surface of the sheet and for moving the sheet in its plane, comprising means for supporting the ball so that it is rotatable in all directions about a fixed mid-point thereof, and at least two frictional-force transmission locations located at the periphery of the ball and disposed at least 90° from one another about said periphery.

4,887,811

BASEBALL SLIDE PRACTICE DEVICE

Thomas M. Tresh, 4256 E. Wing, Mt. Pleasant, Mich. 48858

Filed Jan. 13, 1989, Ser. No. 297,177

Int. Cl.[4] A63G *21/04*

U.S. Cl. 272—56.5 R **13 Claims**

1. A device for use in practicing baseball sliding techniques, said device comprising:

an elongated pad including cushioning material enclosed within a fabric covering; and

an elongated fabric sheet having a lower portion and an upper portion, said sheet overlying said pad and having a width substantially equal to the width of and a length substantially equal to the length of said pad, said sheet being secured to said pad only at said lower portion thereof with said upper portion being free and with said

pad underlying all of said sheet so that a user can land on said upper portion of said sheet and slide on said sheet and the sheet will move freely horizontally along the length of said pad.

4,887,812

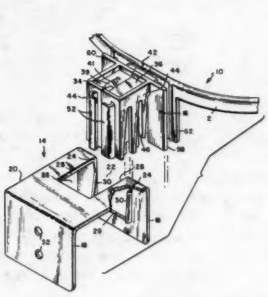
BASKETBALL HOOP SYSTEM

Randall H. Moormann, Georgetown, Mass., assignor to Tonka Corporation, Minnetonka, Minn.

Filed Oct. 27, 1987, Ser. No. 113,879

Int. Cl.[4] A63B *63/08*

U.S. Cl. 273—1.5 R **19 Claims**



1. A basketball hoop and means for mounting the hoop to a support comprising a bracket for attachment to the support, a coupling element attached at one end to the hoop for detachably mounting the hoop to the bracket, said bracket comprising a U-shaped hanger defining spaced, parallel legs spaced apart a distance greater than the thickness of the support for mounting astride the support and means adjustably mounting the coupling element to one leg of the hanger for adjustment relative to the other leg of the hanger for clamping engagement with the support.

4,887,813

BOWLING SCORING DISPLAY SYSTEM

Robert E. Chiles III, Sterling; Bruce R. Neville, Centreville, both of Va.; Richard D. Wattis, Potomac, Md., and Scott Werthmann, Cos Cob, Conn., assignors to AMF Bowling, Inc., Richmond, Va.

Continuation of Ser. No. 918,686, Oct. 14, 1986, which is a continuation of Ser. No. 678,304, Dec. 5, 1984, abandoned. This application Jan. 21, 1988, Ser. No. 155,658

Int. Cl.[4] A63D *5/04*

U.S. Cl. 273—54 C **13 Claims**

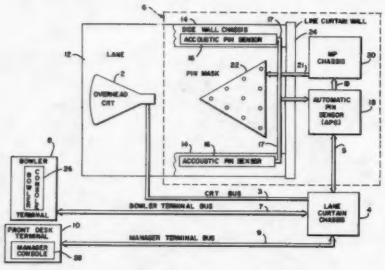
1. In a bowling scoring system that displays game score information for a game of bowling on a display means in one of a plurality of selectable bowling score display formats on

which one or more bowlers' names and/or scores are entered, the combination comprising

means for producing command signals including selectable video format commands, wherein said selectable video format commands include a plurality of different selectable format characteristics for displaying a score card grid pattern having a plurality of horizontal bands for containing alpha-numeric characters representing one of more bowlers' names and/or bowling scoring information relating to said one or more bowlers, and wherein said selectable video format commands determine the dimensions of the horizontal bands and said alpha-numeric characters contained therein

means for producing bowler name graphic signals representing one or more bowlers' names,

means for producing pinfall count signals corresponding to bowling pins knocked down by a bowler,



means for coupling said command signals, said bowler name graphic signals, and said pinfall count signals to a microprocessor means,

said microprocessor means receiving said signals coupled thereto and processing them to produce video graphics signals that include selectable video format information and bowling game score information,

means for receiving said video graphics signals and for selectively producing video format characteristic signals corresponding to one or more of a plurality of video format characteristics associated with a selected one or more of said video format commands, and

means including display means responsive to said video format characteristic signals, said bowler name graphic signals and said game score information for displaying bowling game score information for said one or more bowlers in a selected one of said video formats.

4,887,814

GAME BALL

Benjamin J. Winter, Oakland, Calif., assignor to Winter Design/Manufacturing, Inc., Pleasanton, Calif.

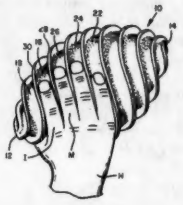
Filed Sep. 22, 1988, Ser. No. 247,666

Int. Cl.[4] A63B *43/02*

U.S. Cl. 273—65 EE **10 Claims**

1. A ball for throwing by an individual in sport and recreational activities comprising:

a body formed of resilient, elastically-deformable material, and having channel means integrally formed in an outer surface of the body for receiving each of an individual's fingers substantially along their respective lengths for



enhancing purchase between the individual's fingers and the body when the ball is gripped.

4,887,815

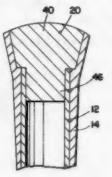
LOW SWING WEIGHT GOLF CLUB SET

James W. Hughes, and James P. Hughes, both of #1 Lynda, Texarkana, Tex. 75503

Continuation-in-part of Ser. No. 106,276, Oct. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 814,780, Dec. 30, 1985, abandoned. This application Nov. 2, 1988, Ser. No. 265,936

Int. Cl.[4] A63B *53/14, 53/00*

U.S. Cl. 273—77 A **30 Claims**



1. A set of numbered golf clubs including a driver and a 9 iron, the set comprising:

a plurality of progressively lofted clubs, each club having a club head, a shaft fixed at one end of the club head and a grip fixed to the shaft at the other end;

a counterweight positioned at the distal end of the shaft opposite each of the respective club heads, said counterweight weighing at least 90 grams;

the weight of the club head of each club progressively increasing as the number of the club increases, the weight of the club heads falling within the range of no greater than 195.8 and no less than 172.6 grams for the driver and no greater than 265.5 and no less than 242.3 grams for the 9 iron; and

the swing weight of the clubs progressively increasing as the number of the club increases, the swing weight of the clubs falling within the range of less than AO minus 16 points on the lorythmic scale for the driver and less than AO minus 6.75 points on the lorythmic scale for the 9 iron.

4,887,816

LOTTERY APPARATUS

George Hanna, Forest Hills, N.Y., assignor to H & Y Enterprises, Forest Hills, N.Y.

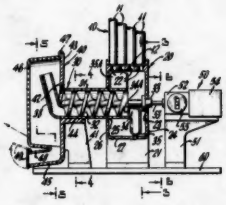
Filed Mar. 22, 1989, Ser. No. 326,919

Int. Cl.[4] A63F *9/00*

U.S. Cl. 273—144 A **11 Claims**

11. A lottery apparatus for randomly picking lottery balls of uniform size from a mixed mass of said balls, which comprises a receptacle for holding said balls, a mixing chamber having at least a semi-cylindrical lower portion, said receptacle and said

mixing chamber having aligned apertures for the passage of said balls from said receptacle to said mixing chamber, a control door between said aligned apertures, a screw conveyor for said balls formed by a rotatable transparent tube with an internal helical baffle disposed substantially horizontally and extending from said mixing chamber to a discharge chamber for said balls, a scoop radially attached to the end of said tube within said mixing chamber, said scoop providing a channel for bringing a single ball to an entry aperture in the end of said



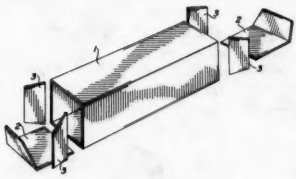
screw conveyor, a pivotally hinged gate that hangs across said aperture when said scoop is at its lowest rotational position and that swings away from said aperture when said scoop is at its highest rotational position, and rotary drive means connected to rotate said screw conveyor together with said scoop so that each time said scoop sweeps upwardly from said semi-cylindrical lower portion of said mixing chamber said balls therein are randomly mixed and a single ball is caused to enter said screw conveyor.

4,887,817

METHOD OF MAKING AND PACKAGING GOLF TEES

Kenneth L. Pelc, 3823 E. Gulf to Lake Hwy., Inverness, Fla. 32650

Continuation of Ser. No. 184,149, Apr. 21, 1988, abandoned. This application Jun. 16, 1989, Ser. No. 368,910
Int. Cl.[4] A63B *57/00*
U.S. Cl. 273—210 **4 Claims**



1. A method of making a multiple pack bundle of at least three golf ball tees of different heights from a square, tubular, cardboard, paper box which has tuck tabs and end flaps, comprising the steps of:

removing the tuck tabs and end flaps from the box;

severing at least three different length sections from the box after removal of the tabs and flaps, each section forming a tee having four fold-joined sides with upper straight edges that define an upper perimeter ball seat and with lower straight edges that define a lower perimeter base;

cutting V-cut serrations, evenly distributed one to a side, to partly interrupt the lower straight edges of each said tee;

collapsing at least two of said serrated tees flat about said fold-joints; and

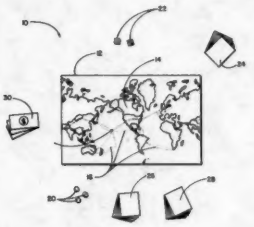
bonding said collapsed tees with one fully opened tee to provide the multiple tee pack bundle.

4,887,818

AIRLINE OWNERSHIP AND TRAVEL GAME

Suzanne Escott, 6531 Gateridge Dr., Apt. 207, Raleigh, N.C. 27612

Filed Jan. 11, 1988, Ser. No. 142,442
Int. Cl.[4] A63F *3/04*
U.S. Cl. 273—254 **6 Claims**



5. An airline ownership, game board and game apparatus for playing the same comprising: a game board having a substantial portion of a world map formed thereon that depicts a plurality of countries; a series of different airline routes formed on the game board and stretching between selected locations on the map; the airline routes defining a plurality of airline entities which serve respective routes; each airline route including a segmented travel path representing a particular airline entity and formed by a series of spaced apart increments; a series of travel tokens forming a part of the game apparatus of the present invention that are moved by respective players along the space increments of a selected route; a deck of destination cards forming a part of the game apparatus with respective cards of the deck defining a selected location along the defined airline routes formed on the map and game board; a group of airline title cards forming a part of the game and game board apparatus with each airline title card identifying a particular airline whose route appears on the game board and the purchase price for that particular airline, and wherein individual players may choose to purchase a selected airline whose route that players token lands on during the course of the game; and simulated money forming a part of the game and game apparatus for allowing players to make financial transactions relating to the game while the game is being played.

4,887,819

CASINO BOARD GAME

John A. Walker, 663 Lefferts Ave., Brooklyn, N.Y. 11203

Filed May 1, 1984, Ser. No. 605,811
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—256 **19 Claims**

17. A game for a plurality of players for playing a plurality of wagering games utilizing a game board for determining the game rules and selection, said game comprising:

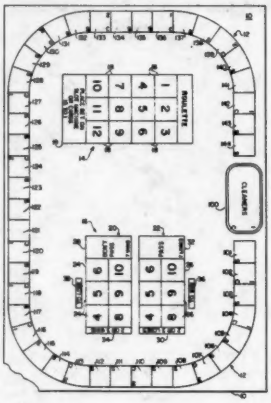
a game board having a plurality of individual spaces which together form a path of progression;

a plurality of board markers, each marker individual to a player, for marking the progression of the players;

first, second and third different wagering apparatuses;

first selecting means usable by a player during that player's turn for selecting one of said wagering apparatuses to be

used to determine the progression of that player's marker along said board path and



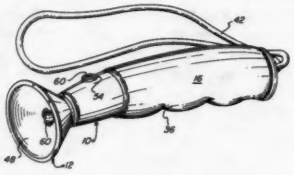
second selecting means usable by a player during that player's turn for selecting which one if any, of said wagering apparatuses to be used by all players for wagering.

4,887,820

VACUUM BALL HOLDING DEVICE

Francis R. Amici, Northford, Conn., and Brian Fontaine, Southbridge, Mass., assignors to Coleco Industries, Inc., Avon, Conn.

Filed Apr. 3, 1989, Ser. No. 332,691
Int. Cl.[4] A63B *65/12*
U.S. Cl. 273—323 **12 Claims**



1. A ball catching and holding device comprising:

(a) an elongated handle formed of a pair of sections mating along the longitudinal axis thereof and means securing said sections in assembly, said handle having a cavity opening at one end thereof, the sidewalls of said sections defining said cavity providing inwardly extending ribs and defining a passage opening on the side of said handle adjacent said one end; and

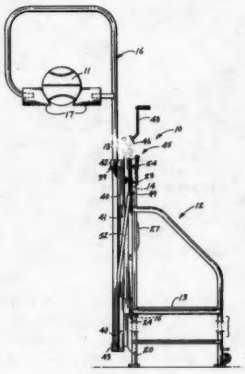
(b) a vacuum cup integrally formed of a resiliently deformable elastomer, said cup having a body portion seated in said handle cavity and a relatively wide holder portion disposed outwardly of said cavity and defining a generally spherical recess at the outer end thereof, said body portion having a conduit portion extending to one side thereof and outwardly of said passage in said handle, said cup having a passage extending coaxially from said spherical cavity to said conduit portion and thence through said conduit portion to open at the end thereof outwardly of said handle, said ribs engaging and supporting said body portion to retain said cup securely in said handle.

4,887,821

GAME BALL SETTING APPARATUS

James E. Greene, P.O. Box 252, and James H. Johnson, Rte. 1, Box 51E, both of Reardan, Wash. 99029

Filed Jul. 25, 1988, Ser. No. 224,062
Int. Cl.[4] A63B *69/00*
U.S. Cl. 273—411 **21 Claims**



1. A game ball setting apparatus releasably mountable to a volleyball referee stand having an elevated user support platform, comprising:

a base frame member;

mounting means on the base frame member adapted to secure the base frame member to the volleyball referee stand adjacent the elevated user support platform thereon;

a ball support frame for receiving and releasably supporting a game ball for release responsive to contact by a player; and

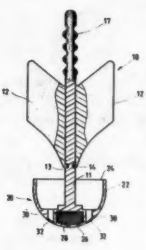
an adjustment means mounting the ball support frame on the base frame member adapted for access by a user from the elevated user support platform and for selectively adjusting the elevation of the ball support frame.

4,887,822

OUTDOOR GAME DART

Peter Tsai, Taipei, Taiwan

Filed Dec. 29, 1988, Ser. No. 291,622
Int. Cl.[4] A63B *65/02*
U.S. Cl. 273—420 **3 Claims**



1. An outdoor game dart, comprising:

an elongated shaft having a front end and an elongated rear end portion, said shaft has a ring-shape groove near said front end;

a flight portion which can wrap the said shaft and counterly

rotate against the said shaft, said flight portion including a plurality of vanes provided thereon and a central sleeve portion, the said sleeve portion has an inward ring-shape jut in the front rim, and the said sleeve portion can be cased on the said shaft at liberty, and the said jut can be curved into the said ring-shape groove perfectly;

a weighted head member mounted at the front end of said shaft, said head member having a substantially semicircular hollow shell, said shell has an enclosed chamber in the front end, said chamber is filled with a weighted material; and

a sounding member being located in the front end of said head member, said sounding member including an air vibration chamber with a proper length and a tongue being located in the front end of said vibration chamber, said tongue is vibrated due to their flow passing by.

4,887,823

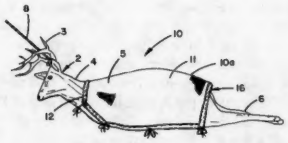
DRAG REDUCING APPARATUS

Thomas D. Hallett, and Donald H. Bierdeman, both of Fargo, N. Dak., assignors to SkiDeer, Inc., Fargo, N. Dak.

Filed Jan. 7, 1988, Ser. No. 141,593

Int. Cl.[4] B62B *13/16*

U.S. Cl. 280—19 **28 Claims**



1. An apparatus for reducing drag when sliding an animal head first along the ground with pulling means, the animal having a neck and head, and the pulling means attaching to the neck or the head of the animal such that the animal can be pulled head first along the ground, said apparatus comprising wrapping means for conforming to the shape of the animal, said wrapping means including a forward edge, a rearward edge, a forward body portion, a central body portion, and a rearward body portion, said forward edge having a substantially smaller lateral dimension than a lateral dimension of the central body portion; said forward body portion being interconnected to said rearward body portion by said central body portion; said forward edge including first securing means for securing said forward edge around the neck of the animal such that said forward edge remains secured when the animal slides head first along the ground, said first securing means being a part of said forward edge, said first securing means being separate from said pulling means.

4,887,824

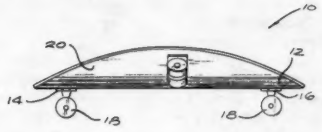
SKATECRAFT

Jeffrey Zatlin, 1115 Fifth St., Santa Monica, Calif. 90403

Filed Aug. 24, 1987, Ser. No. 52,286

Int. Cl.[4] A63C *17/01*

U.S. Cl. 280—87.042 **4 Claims**



1. In a skateboard for use on a surface formed by mounting a plurality of wheels upon a platform, wherein the improvements comprises:

said platform is formed from a single, integral body in more than one plane;

said plurality of wheels each having an axle are mounted upon said more than one plane of said platform such that some of said wheels are normally in contact with said surface and some of said wheels are normally free of contact with said surface;

mounting means on said wheels normally free of contact with said surface for mounting said wheels upon said platform to freely swivel about said mounting means when said wheels contact said surface;

said mounting means having additional means for automatically returning said axles of said normally free wheels into general alignment with said axles of said surface contacting wheels when free of contact with said surface.

4,887,825

SKATEBOARD

D. Mason Allen, and Ashton D. Allen, both of 119 Spring Valley Loop, Altamonte Springs, Fla. 32714

Filed May 1, 1986, Ser. No. 858,117

Int. Cl.[4] A63C *7/14*

U.S. Cl. 280—87.042 **3 Claims**

1. A skateboard adapted to be held against the rider's feet when performing maneuvers on the skateboard comprising;

a skateboard having an elongated platform having a rider's surface and an underside surface and front, rear and center portions, said skateboard also having a pair of wheel truck assemblies attached to the underside of said platform, one wheel truck assembly being attached to the front portion of said platform and the other being attached to the rear portion of the said platform;

a flexible cord attached through an aperture in the center portion of said platform to the bottom of said platform and having a handle attached to the other end thereof, said cord being of a length to be supported with a rider's extended arm, whereby said skateboard platform can be held against the rider's feet when performing skateboard maneuvers;

a spring loaded reel attached to the platform underside between said skateboard wheel truck assemblies, said flexible cord being retractably attached to said retractable reel and extending through an opening therein, said opening facing generally towards the aperture on the center of said platform; and

said skateboard platform aperture having a grommet therein to protect the cord from undue abrasion.

4,887,826

LIGHTWEIGHT FOLDABLE WHEELCHAIR

Richard D. Kantner, 6430 Campina Pl., La Jolla, Calif. 92037

Filed Jun. 10, 1988, Ser. No. 204,716

Int. Cl.[4] B62M *1/1 A*

U.S. Cl. 280—250.1 **21 Claims**

1. A lightweight foldable wheelchair comprising:

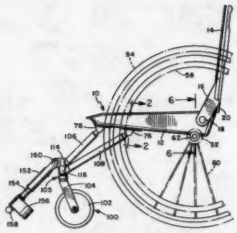
a. a seat having a base and a back hingedly attached thereto;

b. a pair of large wheels each demountably attached at an end of an axle member disposed at the rear portion of said

base of said seat and to the rear of the center of gravity of the chair;

c. a first strut having its rearward end hingedly mounted to the underside forward portion of said base of said seat; and

d. a second strut having its rearward end hingedly mounted to the underside of said base of said seat rearwardly of said first strut and forward of said axle member, the forward



ends of said struts abutting vertically below and forward of said seat and securing a demountable wheeled caster disposed below said forward ends of said struts and a hingedly mounted footrest;

said seat, struts and footrest being foldable into a compact portable configuration following demounting of said large wheels and said caster.

4,887,827

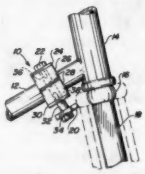
BICYCLE SAFETY TURNING DEVICE

Jack E. Heggie, 3241 E. 28th St., Tucson, Ariz. 85713

Filed Aug. 30, 1988, Ser. No. 238,190

Int. Cl.[4] B62K *5/04*

U.S. Cl. 280—272 **14 Claims**



1. A bicycle safety turning device for installation upon a bicycle frame lower cross bar to prevent the bicycle front wheel from turning to a right angle to the direction of bicycle travel and causing the bicycle to jackknife by selectively limiting turning of the front wheel fork to the left and to the right, the bicycle safety turning device comprising:

a striker plate adapted to be encountered by the front wheel fork to limit turning of the front wheel fork; and

a pair of clamp members adapted to encircle the bicycle frame lower cross bar and a pair of clamp plates juxtaposed said pair of clamp members, said clamp plates adapted to be forcibly urged against said clamp members, said pair of clamp members and said pair of clamp plates operably attached to said striker plate to selectively position said striker plate proximate the front wheel fork, said pair of clamp members comprising members of soft metal and said pair of clamp plates comprising plates made of hardened metal, said soft metal clamp members forcibly engaging the bicycle lower cross bar to frictionally secure said clamp members and thus said striker bar to the bicycle frame lower cross bar to reduce scarring and damage to the bicycle frame lower cross bar whereby the degree of turning of the front wheel fork is selectively limited.

4,887,828

FIXING STRUCTURE OF FORK STEM AND FORK SHOULDER

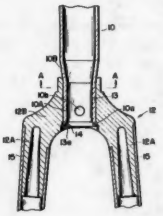
Yoshiya Chonan, Souka, Japan, assignor to Sakae Ringyo Co., Ltd., Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 201,785

Claims priority, application Japan, Feb. 22, 1988, 63-22115

Int. Cl.[4] B62K *19/32*

U.S. Cl. 280—280 **5 Claims**



1. Apparatus comprising a fork stem and a fork shoulder, an insertion end of said fork stem being formed of a material having a first hardness, a plurality of projection ridges of said first hardness formed in an outer periphery of said end and in an axial direction of said fork stem, a through hole formed in said fork shoulder formed of material having a second hardness less than the first hardness and into which said end is forcedly inserted, an outer diameter of said insertion end defined by said ridges being greater than the inner diameter of the through hole to thereby enable deformation of the through hole walls upon insertion.

4,887,829

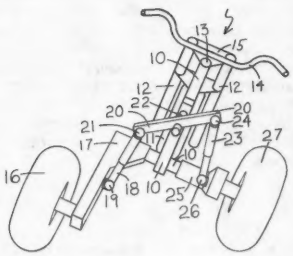
REAR WHEEL SUSPENSION SYSTEM FOR A TRICYCLE VEHICLE

Curtis L. Prince, 1256 Riverbreeze Blvd., Ormond Beach, Fla. 32074

Filed Apr. 7, 1987, Ser. No. 35,360

Int. Cl.[4] B62D *61/06*

U.S. Cl. 280—282 **10 Claims**



1. A three wheeled vehicle having a frame, a front wheel, a pair of rear wheels, means for suspending said rear wheels from the frame comprising:

a left swing arm comprised of:

a upper arm pivotally mounted to the frame on a fixed axis and extending outward from the left side of the frame, a lower arm pivotally mounted to the frame on a fixed axis and extending outward from the left side of the frame substantially parallel to said upper arm, a wheel mounting plate pivotally mounted to said upper and lower arms at their outer ends such that the frame

portion between the arms; the arms; and the wheel mounting plate from a quadrilateral,

a wheel rotatably mounted to the wheel mounting plate of the left side swing arm,

a right side swing arm comprised of:

a upper arm pivotally mounted to the frame on a fixed axis and extending outward from the right side of the frame, a lower arm pivotally mounted to the frame on a fixed axis and extending outward from the right side of the frame substantially parallel to said upper arm, a wheel mounting plate pivotally mounted to said upper and lower arms at their outer ends such that the frame portion between the arms; the arms; and the wheel mounting plate form a quadrilateral,

a wheel rotatably mounted to the wheel mounting plate of the right side swing arm,

a rocker arm pivotally mounted to the frame and disposed above said left and right swing arms,

a left linkage member pivotally mounted at its top to the rocker arm and pivotally mounted at its bottom to the left side swing arm,

a right linkage member pivotally mounted at its top to the rocker arm and pivotally mounted at its bottom to the right side swing arm.

4,887,830

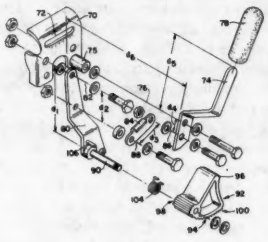
WHEELCHAIR WITH COMBINED WHEEL LOCK AND HILL HOLDER

Gerald E. Fought, Avon, and Raymond J. Herrmann, Westlake, both of Ohio, assignors to Invacare Corporation, Elyria, Ohio

Filed Mar. 29, 1988, Ser. No. 174,825

Int. Cl.[4] B60T *1/04*

U.S. Cl. 280—304.1 **16 Claims**



1. A wheel chair comprising:

a frame assembly;

a seat means for supporting an operator, the seat means being supported by the frame assembly;

a plurality of wheels connected with the frame assembly for rollably supporting the frame assembly;

a combined wheel lock and hill holder assembly mounted to the frame assembly adjacent a periphery of a first of the wheels which has:

a first mode in which the first wheel is free wheeling,

a second mode in which the wheel lock and brack assembly engages the first wheel periphery and prevents rotation of the first wheel in both first and second directions, and

a third mode in which the wheel lock and brake assembly engages the first wheel periphery and limits rotation of the first wheel to the first direction such that the first wheel rotates in the first direction and is locked against rotation in the second direction, wherein the combined wheel lock and hill holder assembly includes:

a cam member with a surface having progressively increasing radii therealong from a minor radius adjacent one end through an intermediate radius portion to a major radius portion in the second mode, and engages the first wheel periphery adjacent the intermediate radius portion in the third mode.

4,887,831

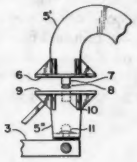
CONVERTIBLE HITCH FOR MOBILE EQUIPMENT

John W. Edwards, P.O. Box 1151, Brandon, Fla. 33511

Filed Sep. 13, 1988, Ser. No. 243,856

Int. Cl.[4] B62D *53/06*

U.S. Cl. 280—416.3 **18 Claims**



13. A convertible hitch for mobile equipment, said convertible hitch comprising:

a first hitch plate attached to said mobile equipment and having a king pin protruding an portion thereof;

a tow bar member removably attachable to a tow bar coupling of a field vehicle, said tow bar member having at least one pair of wheels mounted thereon;

a second hitch plate mounted on said tow bar member and having a central an aperture; for engagement with said king pin of said first hitch plate

a ball joint between said tow bar member and said second hitch plate; and

fastening means for fastening said first and second hitch plates to one another;

wherein said first hitch plate is engageable with either one of a releasable fifth wheel of a highway vehicle and said second hitch plate, so that said mobile equipment may be towed by either one of said highway vehicle and said field vehicle.

4,887,832

CROSS COUNTRY SKI BINDING HAVING FLEXIBLE ARMS ADAPTED TO BE MOUNTED TO AN UPPER SURFACE

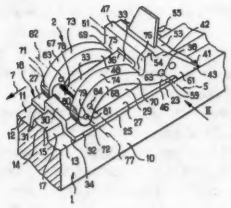
Marc Provence, Annecy-Le-Vieux, France, assignor to Salomon S.A., Annecy Cedex, France

Filed May 19, 1987, Ser. No. 51,381

Claims priority, application France, May 21, 1986, 86 07228

Int. Cl.[4] A63C *9/10*

U.S. Cl. 280—615 **23 Claims**



1. A binding apparatus which is adapted to attach the front end of a boot to a ski, said ski having an upstanding central rib and an upper surface, said apparatus comprising:

(a) a support which is adapted to be pivotably mounted to said ski about a first axis which is transverse to the longitudinal extent of said ski, said support having a front end and a rear end, wherein the rear end of said support comprises

means for retaining said front boot end on said ski when said apparatus is attached to a ski; and

(b) means for elastically biasing said support to rotate about said first axis in a predetermined direction rearwardly and towards the surface of said ski, said elastic biasing means comprising first and second longitudinal tongues adapted to be positioned on either side of said rib of a ski to which said binding is adapted to be attached, said longitudinal tongues being elastically flexible, each tongue having a rear end attached to said support and a front end, the front end of each of said tongues being adapted to be pivotably mounted about a second axis transverse to the longitudinal extent of said ski, wherein said first and second transverse axes are mutually parallel and are spaced from each other, and further comprising means for adjusting the relative positions of said first and second axes with respect to each other.

4,887,833

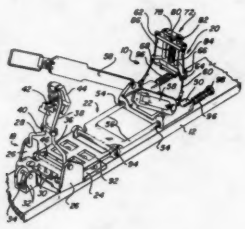
TOURING SKI BINDING

Mark R. Bailey, Frisco, Colo. 80443

Filed Sep. 26, 1988, Ser. No. 248,906

Int. Cl.[4] A63C *9/02*

U.S. Cl. 280—615 **5 Claims**



1. A binding for attaching a boot to a ski, comprising:

a toeplate adapted for attachment to the ski and having means for releasably clamping and laterally securing the toe of the boot to the ski;

a heelplate;

means carried by the heelplate for detachably clamping the heelplate to the heel portion of the boot;

a first laterally rigid hinge leaf pivotally attached to the toeplate for hinged movement about a first transverse axis underlying the toe of the boot;

a second laterally rigid hinge leaft comprising track means longitudinally aligned with the ski and pivotally attached to the first hinge leaf for hinged movement about a second transverse axis which is parallel to the said first tranverse axis and spaced therefrom so that the second axis underlies that portion of the boot containing the ball of the foot;

means slidably interconnecting the heelplate and the track means to provide for relative longitudinal movement toward and away from said second transverse axis to accommodate a longitudinal spreading apart of the heelplate and toeplate as the boot is bent at the ball of the foot raising the heel of the boot off the ski; and

biasing means carried by the track means and operable to normally slide the heelplate toward the toeplate.

4,887,834

FOLDABLE BABY STROLLER CHASSIS

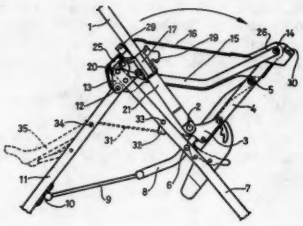
Ramon J. Cabagnero, Barcelona, Spain, assignor to Jané S.A., Barcelona, Spain

Filed Oct. 20, 1987, Ser. No. 111,032

Claims priority, application Spain, Oct. 22, 1986, 8601059; May 27, 1987, 8702010

Int. Cl.[4] B62B *7/08*

U.S. Cl. 280—642 **2 Claims**



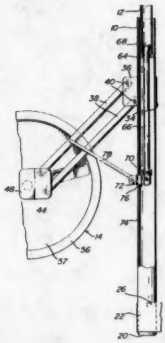
1. A foldable chassis for baby strollers comprising: a first and second rear section; a handle having first and second branches; first and second front legs; first and second back legs pivotally connected with respective corresponding first and second front legs; a strut member having a lower end with a clamp connected to the lower end of said front legs, and connected to a bent arm portion, said bent arm portion having an intermediate pivotal connection to said back legs said intermediate pivotal connection located intermediate said back legs length, said rear section having an intermediate portion pivotally connected to an upper end of said bent arm portion, a plate positioning member connected to said rear section adjacent its lower end and having a portion projecting forwardly of said rear section said handle being pivotally connected to said projecting portion of said plate positioning member, first and second arm rests pivotally connected to respective said first and second rear sections and pivotally connected to said first front and back legs adjacent the pivotal connection and said second front and back legs adjacent the pivotal connection respectively; first and second sliding bushings positioned about said handle first and second branches, each sliding bushing having a front and back hook; a front first and second stub connected to respective said first and second arm rests; rear first and second stubs connected to said respective first and second rear sections; upper limit means connected to said first and second handle branches for limiting the movement of respective first and second bushings in an upward direction; lower limit means connected to said first and second handle branches for limiting the movement of respective first and second bushings in a downward direction; and, biasing means positioned in each of said first and second bushings and engaging said upper limit means for urging said bushings toward said lower limit means; a guard rail having an engageable peg member said armrest having a slot into which said peg member is engageable, said armrest being adapted to be arranged between said legs, each of said armrests including a rectangular box-shaped member having a material covering said box-shaped member being connectable to upper ends of said front legs and to said rear sections, each of said armrests including a bar member within said covering, each said bar member being pivotally connected to an upper end of a corresponding rear section and an upper end of a corresponding back leg, each of said back legs having a plate on which said front leg is hinged and which supports a coupling piece means for said front guardrail.

4,887,835

TELESCOPIC GOLF CART

Michel Dallaire, and Robert Katz, both of Montreal, Canada, assignors to St. Lawrence Manufacturing Canada, Inc., Boucherville, Canada

Filed May 3, 1988, Ser. No. 189,818
Int. Cl.[4] B62B *1/04*
U.S. Cl. 280—646 12 Claims



1. A golf cart including an elongated tubular first member, an elongated tubular second member telescopically slidable in said first member, grip means on said second member, bag supporting means fixedly mounted to said first member, locking means to secure said second member at a desired position relative to said first member, at least a "V"-shaped bracket fixedly mounted to said first member, said "V"-shaped bracket having two arms extending divergingly from one another and rearwardly from said first member, a pair of parallelogram linkages each pivotally mounted at an upper end thereof to a corresponding arm of said "V"-shaped bracket, wherein said parallelogram linkages are adapted to pivot in the respective planes of the arms of the "V"-shaped bracket; a wheel assembly mounted at a lower end of each of the parallelogram linkages, a slot defined longitudinally on a rear part of the first member and below the "V"-shaped bracket, a pair of links each pivotally mounted at one end thereof to an arm of a connector means protruding from said first member through said slot and at another end thereof to a respective one of said parallelogram linkages intermediate said upper and lower ends thereof; a third elongated member provided in said first member, said third elongated member having abutment means for limiting telescopic movement of said third member relative to said second member, said third member being fixedly mounted at a lower end thereof to said connector means, said third member providing a lost-motion movement allowing the second member, to which the grip is mounted, to be extended and retracted relative to the first member a limited distance without causing the wheel assemblies to spread or collapse.

4,887,836

CART WITH FOLDABLE SIDE PANELS

Luther G. Simjian, Fort Lauderdale, Fla., assignor to Command Automation, Inc., Fort Lauderdale, Fla.

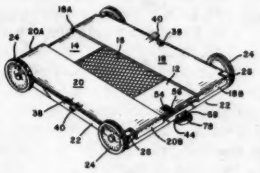
Filed Aug. 31, 1988, Ser. No. 238,566
Int. Cl.[4] B62B *3/02*
U.S. Cl. 280—651 16 Claims

1. A cart comprising in combination:

a flatbed;

a plurality of foldable side panels disposed along the edge of said flatbed and mounted for being movable between a folded position when folded upon said flatbed and an erected position when upstanding from said flatbed;

a handle coupled to said flatbed for pulling said flatbed and panels and being reciprocatingly movable between a stowage position underneath said flatbed and an extended position in which said handle extends outwardly from said flatbed, and



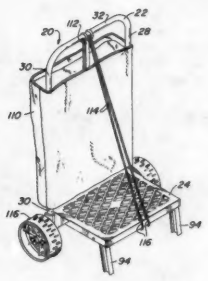
means coupling the reciprocatingly motion of said handle to said side panels for causing the position of said side panels to be responsive to the position of said handle.

4,887,837

CARRIER FOR USE ON BEACHES, ETC.

Theodore J. Bonewicz, Jr., and Henry S. Leichter, both of Philadelphia, Pa., assignors to Al-Mar Precision Co., Philadelphia, Pa.

Continuation-in-part of Ser. No. 58,064, Jun. 4, 1987, abandoned. This application Oct. 31, 1988, Ser. No. 266,320
Int. Cl.[4] B62B *1/04*
U.S. Cl. 280—654 3 Claims



1. A cart for transporting objects onto beaches or other soft surfaces, said cart comprising frame means, a pivotable support platform, and at least two wheels, said frame means including a pair of elongated side rail members each having an upper end portion including handle means and a lower end portion through which an axle passes, said pair of wheels being mounted on said axle, said pivotable support platform comprising a generally planar member having a pair of sides, pivot means establishing a horizontal pivot axis and being coupled to said sides to enable said platform to be pivoted about said axis from a storage position wherein said platform is substantially flush with said frame means to an operative position wherein said platform extends substantially perpendicularly to said frame means, said platform including an underside, having a pair of side lips, and a pair of cantilever brackets disposed therebelow, each of said brackets including an elongated section having a channel therein and being adapted to receive in said channel a respective one of said elongated side rails to hold said platform in its operative position, whereupon said objects can be placed thereon and solidly supported thereby, said cart also comprising at least two support legs, each leg being pivotably attached to said side lips of said platform and being individually retractable and extendable and comprising an upper section with a stop surface which abuts the underside of said platform to prevent overextension of the leg when said leg is placed in its extended position, said cart further compris-

ing a bag installed over said frame means and attached to said handle means for carrying objects, said brackets of said side rails being of circular cross section and each channel in each of said brackets being of generally circular cross section with an entrance mouth and each of said channels comprising beads disposed adjacent said entrance mouth and along the length of said channel, said beads locking said side rails into said channels when said platform is in its operative position, said cart further comprising a second set of brackets connected to said underside of said platform, each of said second set of brackets having an inner surface facing said side lips and being positioned to form a second channel between each of said second set of brackets and each of said side lips of said platform, to receive said legs when said legs are extended, said cart further comprising a second set of beads, each of said beads being disposed along the length of the inner surface of each of said second set of brackets and being disposed on each of said side lips opposite said beads on each of said brackets, said beads being parallel to said platform, the space between said beads being less than the width of said upper section of said legs, so that when said legs are extended, said upper section is forced passed said rows of beads in a snapping action, locking said legs into position.

4,887,838

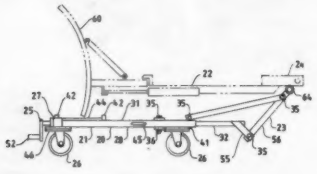
WHEELED CARRIER FOR A SNOW PLOW

William D. Reppen, 6860 Heather Heath La., West Bloomfield, Mich. 48322

Filed May 2, 1988, Ser. No. 188,818

Int. Cl.[4] B62B *5/00*

U.S. Cl. 280—656 **11 Claims**



1. A carrier apparatus for a demountable motor vehicle snow plow, comprising, in combination: a base structure having a pair of side rails adapted to support the blade of a snow plow of the type having an arcuate transverse blade and members attached to the rear of said blade for attaching said blade to a vehicle, a plurality of wheels mounted on the underside of said base structure for transporting and aligning the attaching members of the plow with the attaching members of a motor vehicle; an elevating structure attached to said base structure, said elevating structure being adapted for raising and lowering the attaching members of the plow and cooperating with said wheels to support and align the attaching members of the plow with the attaching members of said motor vehicle; and a singular jackscrew means for raising and lowering said elevating structure, said jackscrew means comprising an extensible member having a fixed member fixedly attached to said base structure, a moveable member telescopingly engaging and projecting outwardly from said fixed member, and a jackscrew attached to said fixed member and operatively engaging said moveable member for selectively urging said moveable member inwardly and outwardly from said fixed member to raise or lower said elevating structure.

4,887,839

AUTOMOTIVE SUSPENSION SYSTEM SUPPRESSIVE OF TOE-OUT CHANGE IN RESPONSE TO LONGITUDINAL SHIFTING OF LOAD

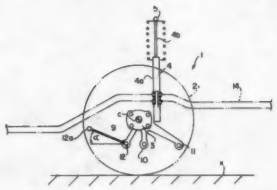
Yoshiaki Yoshimoto, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Jan. 9, 1987, Ser. No. 1,899

Claims priority, application Japan, Jan. 10, 1986, 61-3008; Jan. 10, 1986, 61-3009; Jul. 30, 1986, 61-179363

Int. Cl.[4] B60G *3/00*

U.S. Cl. 280—690 **9 Claims**



1. An automotive suspension system comprising:

a first member rotatably supporting a road wheel;

a second member connecting said first member to a vehicle body, said second member having a first end rigidly connected to said first member and a second end connected to said vehicle body via a first elastic member, said second member having an axis crossing said vehicle body at a first point;

a plurality of transversely extending third members including a most forward and most rearward third member, said third members being substantially parallel to each other, each of said third members being connected to said first member at a first end and to said vehicle body at a second end for determining transverse position of said first member, each of said third members being connected to said first member and said vehicle body via second elastic members provided at said first and second ends thereof; and

a fourth member having a first end connected to said first member and a second end connected to said vehicle body for determining longitudinal position of said first member, said second end being so oriented to direct an axis of said fourth member to cross transversely extending axes of respective third members at positions transversely shifted from said first point so that an inward force exerted on said first elastic member by said second end of said second member is greater than or equal to the inward force to be exerted on one of said second elastic members which is associated with the second end of the most rearward of said third members, thereby suppressing toe-out change in compliance steer.

4,887,840

SUSPENSION CONTROL APPARATUS FOR A VEHICLE

Mitsuhiko Harara; Shozo Takizawa; Tadao Tanaka, all of Okazaki; Shunichi Wada, and Shigeki Ohtagaki, both of Himeji, all of Japan, assignors to Mitsubishi Kenki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 7, 1988, Ser. No. 267,951

Claims priority, application Japan, Nov. 5, 1987, 62-169215[U]

Int. Cl.[4] B10H *17/06*

U.S. Cl. 280—707 **4 Claims**

1. A suspension control apparatus for a vehicle comprising:

a plurality of suspension units each disposed between a road wheel and the body of a vehicle for suspending the corresponding road wheel from the vehicle body;

a vehicle-height sensing means sensing a vertical distance

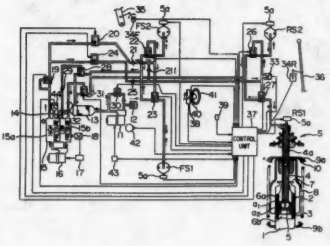
between an axle of each of said road wheels and a specific portion of the vehicle body;

roll sensing means sensing a rolling state of the vehicle body;

nose-dive and squat sensing means sensing a nose-dive state and a squat state of the vehicle;

pitching and bouncing sensing means sensing vertical movements of the vehicle body including pitching and bouncing thereof; and

a control unit electrically connected to receive outputs of said vehicle-height sensing means, said roll sensing means, said nose-dive and squat sensing means, and said pitching and bouncing sensing means for controlling said suspension units in such a manner that if there is a difference between the vertical distance sensed by said vehicle-height sensing means and the target vehicle height, the difference is reduced to zero, and that forces acting between the road wheels and the vehicle body are adjusted to suppress the nose diving, squatting, pitching and bouncing of the vehicle body, said control unit being further operable to determine the order of priority for the vehicle-height and roll control, the nose-dive and squat control, and the pitching and bouncing control so that the vehicle-height control is stopped during the time when a control having higher priority than the vehicle-height control is being carried out.



4,887,841

VEHICLE SUSPENSION

David Cowburn, Sedgley, United Kingdom; Stephen P. Rawlings, Lake Orion, Mich., and Andrew Pollard, Bridgnorth, United Kingdom, assignors to GKN Technology Limited, West Midlands, England

PCT No. PCT/GB87/00260, § 371 Date Jun. 6, 1988, § 102(e) Date Jun. 6, 1988, PCT Pub. No. WO87/06539, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 16, 1987, Ser. No. 203,454

Claims priority, application United Kingdom, Apr. 23, 1986, 8609920; Jul. 2, 1986, 8616182; Nov. 19, 1986, 8627640

Int. Cl.[4] B60G *11/08*; F16F *1/36*

U.S. Cl. 280—719 **3 Claims**

1. A suspension for suspending a pair of wheels of a vehicle relative to the structure of the vehicle, comprising:

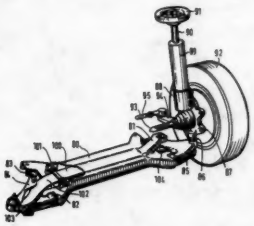
a spring in the form of an elongate leaf, made of fibre-reinforced plastics material and extending transversely of the vehicle;

the spring comprising a central portion and two end portions, the end portions extending from respective ends of the central portion of the spring at opposite sides of the vehicle;

respective means supporting the spring at the ends of the central portion thereof, for pivotal movement about respective axes extending generally longitudinally of the vehicle;

respective arm members pivoted to the vehicle structure and connected to wheel carrier members for the wheels of the vehicle;

the spring end portions bearing on the pivoted arm members, whereby when the arm members are caused to pivot the central portion of the spring is caused to undergo bending deflection; and



the end portions of the spring being inclined to the central portion thereof, considered in plan view, whereby the central portion of the spring is spaced transversely of the vehicle an inward of the centres of the wheels.

4,887,842

GAS BAG

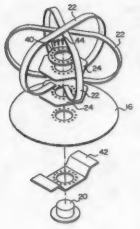
Koki Sato, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Niwa, Japan

Filed Aug. 12, 1988, Ser. No. 231,267

Claims priority, application Japan, Aug. 17, 1987, 62-124863[U]

Int. Cl.[4] B60R *21/08*

U.S. Cl. 280—730 **19 Claims**



1. A gas bag interposed between an occupant and a vehicle during inflation of said gas bag, comprising:

a bag body for being inflated by a gas;

at least one strap for retaining longitudinally opposite end portions of said bag body, with a part of an intermediate portion thereof being threaded through a plurality of through-holes formed in said bag body, and a cover provided on an outer surface of said bag body and adapted to cover said through-holes, wherein portions of said strap between said part of said intermediate portion and each of said opposite end portions respectively being disposed inside said bag body so as to restrict an amount of inflation of said bag body.

4,887,843

CHARGING SYSTEM FOR A STEERING WHEEL MOUNTED AIR BAG SYSTEM

Harald Husby, Budd Lake, N.J., assignor to Breed Automotive Technology, Inc., Wilmington, Del.

Filed Oct. 2, 1986, Ser. No. 914,656

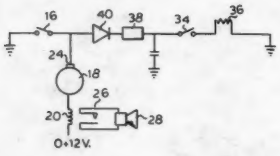
Int. Cl.[4] B60R *21/32*

U.S. Cl. 280—735 **8 Claims**

1. In a motor vehicle having a battery and a horn circuit formed of a horn activating means in series with a horn switch

and said battery for energizing a horn, an air bag control circuit for inflating an airbag comprising:

an energy storage element in series with said battery and said horn activating means;



a sensor for generating a signal indicative of a crash said sensor being configured so as to allow a driver independent control of said horn during said signal generation; and

trigger means energized by said energy storage element in response to said signal.

4,887,844

OFF-ROAD VEHICLE

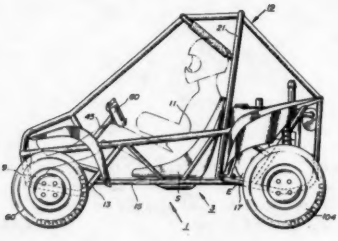
Akito Enokimoto; Eiji Hosoya; Keiji Kasa; Akio Handa; Makoto Ishiwatari, and Kousei Mizumoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 112,817, Oct. 23, 1987, Pat. No. 4,836,325. This application Nov. 7, 1988, Ser. No. 268,255

Claims priority, application Japan, Oct. 23, 1986, 61-253379; Oct. 23, 1986, 61-253380; Oct. 23, 1986, 61-253381

Int. Cl.[4] B60C *3/20*

U.S. Cl. 280—779 **5 Claims**



1. An off-road vehicle comprising:

a frame assembly constructed of a plurality of pipes including at least on lateral pipe extending horizontally and transversely of the vehicle;

two front wheel suspension having respective knuckle arms;

two front wheels rotatably supported respectively on said front wheel suspensions;

two rear wheels rotatably supported on lateral sides of a rear portion of said frame assembly;

an engine mounted on the frame assembly for at least driving said rear wheels;

a steering mechanism having a steering column supporting a central steering arm on a lower end thereof and a steering handle on an upper end thereof, and tie rods having first ends coupled to said central steering arm and second ends coupled to said knuckle arms, respectively; and

said central steering arm being located upwardly of said lateral pipe of said frame assembly.

4,887,845

LABEL FOR FOOD-CONTAINING CAN OR THE LIKE

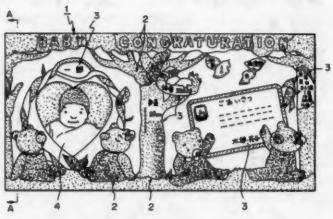
Yoshihiro Nagai, Tokyo, Japan, assignor to Tokyo Nagai Co., Ltd., Tokyo, Japan

Filed Mar. 13, 1987, Ser. No. 25,343

Claims priority, application Japan, Apr. 8, 1986, 61-80665; Dec. 5, 1986, 61-187595[U]

Int. Cl.[4] B42D *15/00*; G09C *3/02*; A44C *3/00*

U.S. Cl. 283—81 **1 Claim**



1. The label for attachment to the surface of a container such as a can, comprising:

a label body;

an opening in said label body created by removal from the label body of a cutout portion having a given size and configuration, the opening thereby being defined by the body portion remaining after removal of the cutout portion;

a photograph having substantially the same size and configuration as said opening and being inserted therein; and

a substantially transparent coating covering at least the obverse surface of the combination of said label body and said photograph and being firmly bonded thereto, the combination of label body, photograph and coating being capable of conforming to the surface of the container for attachment thereto.

4,887,846

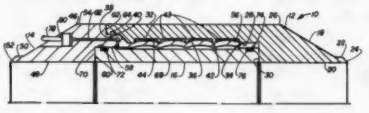
SUBSEA TUBULAR JOINT

Arthur H. Chin, and William M. Taylor, both of Houston, Tex., assignors to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Apr. 22, 1988, Ser. No. 184,665

Int. Cl.[4] F16L *13/4*

U.S. Cl. 285—18 **11 Claims**



1. A tubular joint comprising

a first tubular member having a first body with a central bore therethrough, a first rim extending axially therefrom and with a first internal shoulder facing in the direction said first rim extends,

a second tubular member having a second body with a central bore therethrough, a second rim extending axially therefrom and with a second internal shoulder facing in the direction said second rim extends,

said second rim having an outer diameter less than the inner diameter of said first rim so that it fits therein,

said first rim having an internal land and groove recess,

a sleeve positioned within said first and second rims and between said shoulders and having a central bore therethrough of substantially the same diameter as the diameters of the first and second body central bores,

sealing means surrounding said sleeve near its ends for sealing against the interior of said second rim, and

means providing fluid communication through one of said tubular members from the exterior of said tubular members to a position between said sealing means on the exterior of said sleeve and the interior of said second rim,

said sleeve having sufficient strength to withstand the pressure supplied through said fluid communication means to force said second rim outward against said first rim.

4,887,847

TUBE CONNECTOR

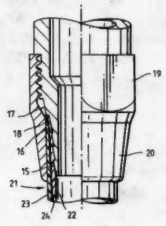
Itzhak Barnoach, London, England, assignor to Kitechnology B.V., Netherlands

Filed Aug. 3, 1988, Ser. No. 227,836

Claims priority, application United Kingdom, Aug. 3, 1987, 8718328; Mar. 21, 1988, 8806654

Int. Cl.[4] F16L *11/12*

U.S. Cl. 285—52 **22 Claims**



1. A metal connector for connecting to an end of an imperforate metal tube that is both internally and externally coated with a predetermined thickness of plastics material, comprising:

a male portion, including a tapered shank having a minimum external diameter which is approximately the same as the internal diameter of the tube and a maximum diameter which is greater than the internal diameter of the tube and is adapted to be inserted into said end of the tube and, adjacent to the tapered shank, a first shoulder to form a stop for the tube end, the shoulder have a radial depth that is less than the thickness of the internal layer of plastics material thereby permanently preventing contact of the metal tube with the metal connector.

4,887,848

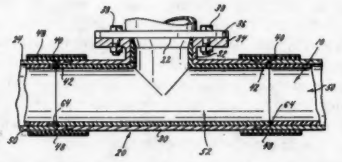
REPLACEABLE PIPE LINER ASSEMBLY

Phillip E. Burba, Kirkwood, Mo., assignor to Dynasauer Corporation, St. Louis, Mo.

Filed Oct. 31, 1988, Ser. No. 264,767

Int. Cl.[4] F16L *41/00*

U.S. Cl. 285—55 **15 Claims**



1. A replaceable pipe liner assembly for lining a pipe assembly having pipes for dispensing an abrasive material, wherein the pipes connect to T fittings, each T fitting having a main pipe portion and an angle portion, said pipe liner assembly comprising: a plurality of tubular plastic liner sections positioned in end-to-end contact, the outer diameters of said liner sections being less than the inner diameter of the pipe to allow ease of insertion of the liner sections into the pipe, each liner section having means interfitting with an adjacent liner section to axially align the liner sections and present a smooth liner wall, the liner sections being slidable within said pipe for insertion of the liner sections into said pipe with the liner sections in interfitting end-to-end engagement; a replaceable T-shaped liner section for each T fitting, each T-shaped liner section having a main tubular portion with an outer diameter less than the inner diameter of the main pipe portion of the T fitting and a second tubular portion intersecting said main tubular portion, said second tubular portion having an outer diameter less than the inner diameter of the angle portion of said T fitting, said entire T-shaped liner being of molded plastic, one-piece construction, and said second tubular portion being foldable inwardly substantially within said main tubular portion for insertion of said T-shaped liner into the T fitting and being resilient to release back to its original shape when no longer restrained as when the T-shaped liner is positioned within said T fitting such that the second tubular portion is aligned with the angle portion if the T fitting, the main tubular portion of said T-shaped liner being in end-to-end engagement with, and of the same inside diameter as, adjacent tubular liner sections.

4,887,849

CONNECTION SYSTEM FOR INTERCONNECTING A HEAT EXCHANGER AND A PIPE UNION

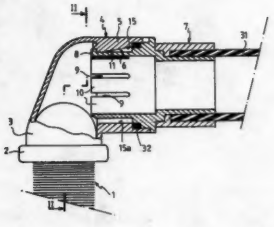
Gilles Briet, Gueugnon, France, assignor to Hutchinson, France

Filed Feb. 2, 1989, Ser. No. 305,803

Claims priority, application France, Feb. 2, 1988, 8801186

Int. Cl.[4] F16L *37/00*

U.S. Cl. 285—91 **9 Claims**



1. A connection system for interconnecting a heat exchanger and a pipe union, with the pipe union opening out into a connection tube of a water box of the heat exchanger, the pipe union being fixed firstly to a flexible pipe by permanent connection means, and secondly to the tube by resilient connection means constituted by co-operation between an annular neck formed in the union and an internal annular shoulder formed in the tube and intended to engage resiliently in said neck, with sealing being provided by an elastomer ring for being radially compressed between the tube and the union, wherein:

said neck is delimited at the leading end of the pipe union by a snap-fastening flange for engaging the internal shoulder of the tube, which flange is discontinuous and constituted by snap-fastening catches which are uniformly spaced around the circumference of said leading end;

the neck includes portions which are delimited by said snap-fastening catches alternating with portions which are not delimited by snap-fastening catches, with those portions of the neck which are not delimited by snap-fastening catches being separated from those portions which are delimited by snap-fastening catches by means of axial slots extending from the leading end of the union over substantially the entire length of the neck, thereby dividing the end of the union into a plurality of axial fingers which

carry said catches and which are radially resilient, and a plurality of cylindrical portions for guiding the union inside the tube;

said internal annular shoulder of the tube is also discontinuous, in a manner complementary to said snap-fastening flange, said shoulder comprising a first plurality of axial grooves and a second plurality of axial grooves, with each groove in the first plurality:

being intended to pass a corresponding finger with its snap-fastening catch while the union is being assembled to the tube;

being located between two grooves of said second plurality; and

being separated from said grooves of said second plurality by projecting shoulder portions over which said cylindrical portions of the pipe union slide;

whereas each groove of said second plurality serves for releasing a corresponding finger when disconnecting the union from the tube, by rotating the union so as to bring its fingers from a locking position in which they are in alignment with said grooves of the first plurality to an unlocking position in which the fingers are in alignment with the grooves of said second plurality.

4,887,850

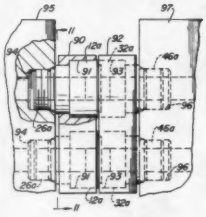
ADAPTER FITTING

David E. Albrecht, 1383 Granary Rd., Blue Bell, Pa. 19422

Division of Ser. No. 776,497, Sep. 16, 1985. This application May 10, 1989, Ser. No. 349,652

Int. Cl.[4] F16L *23/00*

U.S. Cl. 285—137.1 **2 Claims**



1. An adapter fitting arrangement for connecting two manifolds or the like in flow communication at a plurality of locations having threaded outlet connections comprising:

a first splice plate having a plurality of bolt holes arranged in a pattern and two spaced apart bores extending therethrough and located within said bolt hole pattern,

a second splice plate having a plurality of bolt holes arranged in a pattern and two spaced apart bores extending through and located within said bolt hole pattern,

said bolt holes and said bores in said first and second splice plates being arranged in similar patterns so as to be axially aligned,

a pair of first mounting members each of which is mounted in one of said bores of said first splice plate, each of said first mounting members including a first body portion held in said first splice plate bore, a second body portion extending beyond said first splice plate to a location spaced therefrom, said extended end of said second body portion having threads formed thereon for engagement with a threaded flow connection of one of the manifolds, and a fluid flow passage extending through said body portions,

and a pair of second mounting members each of which is mounted in one of said bores of said second splice plate, each of said second mounting members including a first body portion held in said second splice plate bore, a second body portion extending beyond said second splice plate to a location spaced therefrom, said extended end of said second body portion having threads formed thereon for engagement with a threaded outlet connection of the other of said manifolds, and a fluid flow passage extending through said body portions,

bolt means cooperable with said bolt holes in said first and second splice plates for engaging the same to draw said splice plates together to bring said first body portions of said first and second mounting members together in mating face-to-face contact with said fluid flow passages thereof in flow communication.

4,887,851

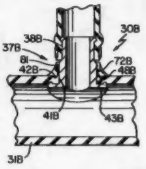
BRANCHES HOSE CONSTRUCTION, JOINT CONSTRUCTION AND PART THEREFOR, AND METHODS OF MAKING THE SAME

James B. Rush, Waynesville; James S. Bryan, Clyde; Jonas L. Gunter, Canton; Guy W. Dillard, Sylva; Roger D. Meadows, Waynesville, and Pearison W. Henry, Sylva, all of N.C., assignors to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 911,585, Sep. 25, 1986, Pat. No. 4,735,443, which is a division of Ser. No. 709,962, Mar. 8, 1985, Pat. No. 4,637,638. This application Feb. 8, 1988, Ser. No. 153,760

Int. Cl.[4] F16L *41/00*

U.S. Cl. 285—158 **1 Claim**



1. In a branched hose construction comprising a first tubular member provided with opposed ends and with an opening therein intermediate said opposed ends thereof, a second tubular member provided with opposed ends, and a joint construction comprising a tubular insert provided with opposed ends joining one of said ends of said second tubular member to said opening by having one end of said tubular insert disposed through said opening and the other end thereof interconnected to said one end of said second tubular member whereby said tubular members are in fluid communication with each other through said tubular insert and said second tubular member branches outwardly from said first tubular member, said tubular insert having an outwardly extending annular flange at said one end positioned inside said opening, said joint construction comprising a washer-like member telescoped on said tubular insert and cooperating with said annular flange of said tubular insert in mechanically clamping said one tubular member therebetween completely around said opening thereof, said joint construction comprising securing means securing said washer-like member to said tubular insert in said clamping relation thereof, said securing means comprising a fastening member also telescoped on said tubular insert, the improvement wherein said tubular insert has external serration means thereon, said fastening member comprising an annular flat washer interlocked with said serration means of said tubular insert and engaging and compacting said washer-like member toward said one end of said tubular insert, said washer-like member has an annular groove therein that defines a flat annular shoulder at the bottom of said groove, said fastening member having opposed flat sides and being disposed in said groove with one of said opposed flat sides thereof being in engagement with said flat shoulder of said washer-like member, whereby said fastening member performs the dual function of securing said washer-like member to said tubular insert and compressing said one tubular member so as to be held in a certain com-

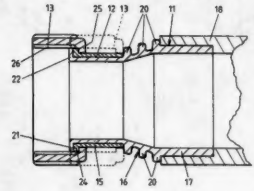
pacted condition between the thus secured together washer-like member and tubular insert.

4,887,852

PIPE CONNECTOR

Arnold H. Hancock, Woodville North, Australia, assignor to Aquacorp Limited, Australia

Filed Dec. 20, 1988, Ser. No. 287,122
Claims priority, application Australia, Dec. 21, 1987, PI6003
Int. Cl.[4] F16L *55/00*
U.S. Cl. 285—175 11 Claims



1. Improved coupling means for interconnecting in sealing relationship two pipe sections, especially two longitudinally misaligned pipe sections, comprising a one-piece deformable and flexible hollow tubular connector formed of resilient plastics material and having a first tubular end portion which terminated in a radially out-turned flexible, deformable flange which forms an annular sealing end face arranged to sealingly engage against an end surface of a first pipe section, a second tubular end portion adapted for connection to a second pipe section, and an intermediate portion having a plurality of annular axially spaced, thickened portions constituting strengthening ribs for increasing the burst pressure capability of the connector;

a relatively short length reinforcing sleeve formed of relatively rigid material supported co-axially with respect to said first end portion and in contiguous fixed relationship therewith, and a coupling slip nut slidably located around said first end tubular portion and supported for both rotational and axial movement relative thereto, said slip nut having an internally threaded portion for threadably engaging a thread on the first pipe section and an inturned abutment shoulder for acting on said radially out-turned flange upon tightening of the nut so as to effect sealing engagement between the annular sealing end face and the end surface of the first pipe section.

4,887,853

METHOD AND APPARATUS FOR PROVIDING A UNITARY ASSEMBLY OF TUBING AND A TERMINATING FITTING

Charles V. Flowers, Fairport, and Bernard J. Sass, West Ontario, both of N.Y., assignors to ITT Corporation, New York, N.Y.

Filed Aug. 28, 1987, Ser. No. 90,864
Int. Cl.[4] F16L *13/08*
U.S. Cl. 285—287 10 Claims

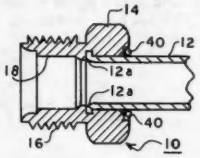
1. A method for forming a unitary assembly of tubing with a threaded terminating fastener, said method comprising the steps of:

providing a threaded fitting having a tubular opening therein extending through said fitting along the longitudinal axis thereof;

providing an annular groove in a wall portion of said tubular opening which is spaced apart from a first end of said fitting;

providing a stop shoulder at the inner end of said annular groove to limit the insertion of a tube into said opening said stop shoulder having an inner diameter less than the inner diameter of any portion of said tubular opening

inserting said tube into said opening of said fitting through said first end wherein at end portion of said tube extends across said groove;



inserting a mandrel into the other end of said fitting into engagement with said end portion of said tube; and,

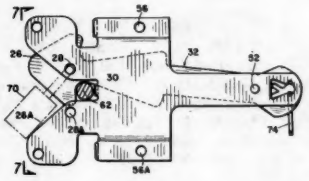
forcing the end portion of said tube into said groove to provide a substantially continuous transitional area between the bore of said tube, said stop shoulder and the adjacent wall portion of said tubular opening.

4,887,854

GATE SUPPORT LATCH

Paul J. Bulten, Tulsa, Okla., assignor to Fence Hardware Specialties, Inc., Tulsa, Okla.

Filed Apr. 19, 1988, Ser. No. 183,070
Int. Cl.[4] E05C *3/14*
U.S. Cl. 272—238 10 Claims



1. A gate latch structure for receiving a striker bar which comprises:

a longitudinal main frame having a striker receiving notch at a forward end with an inner end; two opposite cam surfaces flaring outwardly from said notch;

a retainer stub fixed to said main frame at said inner end of said notch;

a substantially flat keeper parallel with said main frame having a longitudinal axis and a V-shaped head forming an upper and lower striker receiving cam surfaces with upper and lower lock notches positioned near a forward end of said keeper;

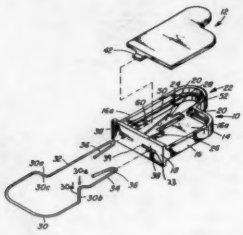
a single pivot connecting said keeper to said main frame at a rearward end so that said keeper can pivot from a first position where one of said lock notches closes said striker receiving notch and a second position where the lock notch is clear of said striker receiving notch permitting a striker bar to enter the leave said notch.

4,887,855

SHACKLE TYPE SEAL

Victor R. Tritton; Gary E. Tritton, both of Pointe Claire, and Paul F. Chevillard, Terrebonne, all of Canada, assignors to Les Enterprises Tritton Ltee, Montreal, Canada

Filed Jul. 24, 1986, Ser. No. 890,088
Claims priority, application Canada, Jul. 31, 1985, 487901
The portion of the term of this patent subsequent to Feb. 12, 2005, has been disclaimed.
Int. Cl.[4] B65D 55/02
U.S. Cl. 292—307 R 21 Claims



1. A shackle type seal comprising first and second body portions enclosing a hollow chamber therebetween, and defining a shackle leg-receiving area adapted to receive a pair of shackle legs, shackle leg engaging means within said chamber adapted to engage a shackle leg inserted into said chamber, at least one aperture in an end surface of said body in communication with said chamber and adapted to receive a shackle leg therethrough, stop means on one of said body portions adapted for insertion into said aperture to prevent access through said aperture and egress of a shackle leg therefrom after insertion into said chamber, and means securing said body portions together to form a seal assembly.

4,887,856

LOCK MOUNTING ASSEMBLY

Stephen L. Percoco, Hull, Mass., and Jane M. Percoco, 41 Prospect Ave., Hull, Mass. 02045, assignors to Ann M. Percoco and Jane M. Percoco, both of Hull, Mass.

Continuation of Ser. No. 155,145, Feb. 11, 1988, abandoned. This application Jul. 11, 1989, Ser. No. 378,046
Int. Cl.[4] E05B 9/00
U.S. Cl. 292—337 7 Claims

2. A lock hardware-mounting assembly comprising:

an L-shaped member having an edge plate and a front plate forming a right angle therewith,

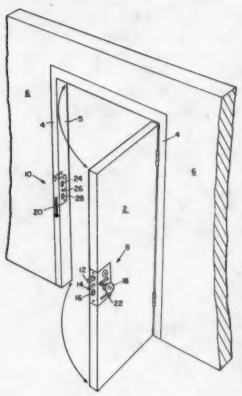
the edge plate being engageable with the edge of a door and the front plate being engageable with the front of the door,

a solid, one piece, metal block permanently secured to the inside of the L-shaped member and forming an integral solid block core thereof, the solid block core being receivable within a recess in the edge of the door,

a cover plate engageable with the inside of the door and releasably secured to the solid block core,

a plurality of cylindrical bores passing through the one piece metal block to accommodate lock operating hardware, the axes of the bores being parallel to each other and normal to the front plate,

a transverse bore associated with and intersecting each cylindrical bore and passing through the one piece metal block to accommodate a slideable locking element, the axes of the transverse bores being parallel to each other and normal to the edge plate, and



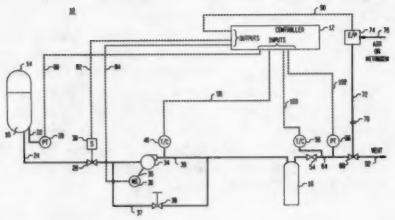
a slot in the solid block extending parallel to the cylindrical bores to receive a head of a chain lock;

4,887,857

METHOD AND SYSTEM FOR FILLING CRYOGENIC LIQUID CONTAINERS

James VanOmmeren, Werley's Corner, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 888,655, Jul. 22, 1986. This application Jan. 5, 1989, Ser. No. 293,732
Int. Cl.[4] F17C 13/00
U.S. Cl. 141—1 9 Claims



1. A method for minimizing cryogenic substance loss in a filling station having a storage tank storing cryogenic substance for loading a container having an outlet vent with a throttle vent valve for adjusting the differential pressure between the substance being loaded and the container, comprising the steps of:

(a) first determining a value of filling loss for each of a plurality of values of differential pressure;

(b) selecting and storing prior to loading an optimum value of differential pressure from the plurality of values to produce the minimum filling loss;

(c) loading substance into a container;

(d) continuously monitoring the differential pressure during loading;

(e) comparing the monitored differential pressure to the optimum differential pressure;

(f) adjusting the throttle vent valve to maintain the monitored differential pressure at a value substantially equal to the optimum differential pressure value;

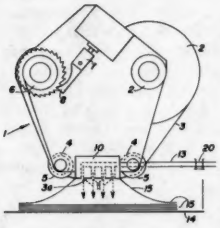
(g) selecting at least one new optimum value of differential pressure during loading of the container;
(h) adjusting the throttle vent valve to bring the differential pressure to a value substantially equal to the new optimum differential pressure value during loading of the container; and
(i) repeating steps (g) and (h) until the filling process is terminated.

4,887,858

DEVICE WITH ADHESIVE FOR THE HOLDING OF THIN TEXTILE ARTICLES

Vinicio Gazzarrini, Florence, Italy, assignor to Solis S.R.L., Florence, Italy

Filed Jan. 15, 1988, Ser. No. 144,401
Claims priority, application Italy, Oct. 14, 1987, 9509 A/87
Int. Cl.[4] B65H *3/08, 3/20*
U.S. Cl. 294—1.1 5 Claims



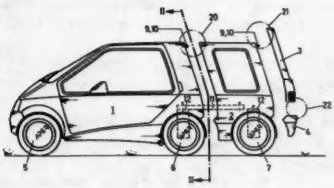
1. Device for the temporary holding of articles of hosiery fabrics with permeable surfaces, especially tubular pantyhoses and stockings, comprising: a holding device with adhesive, including a tape-like adhesive element having a holding zone, two transmission and tension members, drive means for intermittently moving the adhesive elements forwards between the two transmission and tension members, a block for the support of the holding zone of the adhesive element and an underlying support for a plurality of the articles each equally oriented and overlapping to form a stack; means for providing at least a jet of compressed air acting in the vicinity of at least one of the edges of said holding zone of the tape, at an inclined direction with respect to the permeable holding surface of the articles and in an opposite direction with respect to that of the retention force of the adhesive tape, said means for providing at least a jet of compressed air including at least a body fixed to the support structure of the holding device with adhesive between the two transmission and tension elements of the tape, laterally to the holding zone of the tape, said body being provided with a plurality of nozzles communicating through a common duct with a supply of compressed air, the flow of compressed air being activated and respectively cut off, by means of a solenoid valve inserted on the supply duct and associated to a timer and whose intervention is synchronized with the holding device and the articles support, the jet of compressed air being generated after the holding of each one of the articles of the stack by the adhesive zone of the holding device and during at least a fraction of the phase for the withdrawal of the support with the articles from the holding device with adhesive so that the jet of compressed air passes through the permeable holding surface urging a next adjacent underlying article surface away from the holding surface thereby separating the surfaces.

4,887,859

MOTOR VEHICLE HAVING A CENTRAL EXTENSION SECTION

Ludwig Aper, Julianenstrasse 10, D-6524 Guntersblum, Fed. Rep. of Germany

PCT No. PCT/DE85/00127, § 371 Date Nov. 19, 1987, § 102(e) Date Nov. 19, 1987, PCT Pub. No. WO86/06337, PCT Pub. Date Nov. 6, 1986
PCT Filed Apr. 19, 1985, Ser. No. 138,194
Int. Cl.[4] B62D *63/02*
U.S. Cl. 296—26 1 Claim



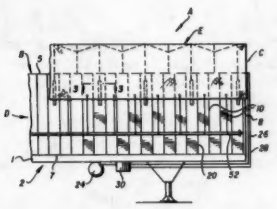
1. Motor vehicle comprising a forward section containing the driving mechanism,
a removable middle section,
a removable rear wall which alternately can be connected to the middle section or to the forward section,
connecting means operable to connect said middle section and said rear wall to said forward section,
said connecting means comprising an upper multiple screw connection means for connecting edges of said sections and said wall, and
a lower multiple screw connection means for connecting edges of said sections and said wall,
and two longitudinally extending connecting rods disposed between the upper and the lower screw connection means,
said forward section comprising rear wheels and shock absorbers including legs having upper ends,
said middle section including wheels and shock absorbers including legs having upper ends,
said connecting rods releasably connected with their two ends to the upper ends of the shock absorbing legs of the rear wheels of the forward section and of the shock absorbing legs of the wheels of the middle section.

4,887,860

VERTICALLY ADJUSTABLE TRAILER

Alvis E. Dowty, 4117 Renee, Jonesboro, Ark. 72401

Filed Sep. 22, 1988, Ser. No. 247,510
Int. Cl.[4] B62D *33/08*
U.S. Cl. 296—26 31 Claims



1. A vertically adjustable trailer, comprising:
(a) a body portion including a floor and a plurality of opposing walls extending from said floor;
(b) said walls defining an open space therebetween;

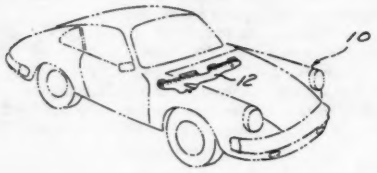
(c) a roof adjustably mounted atop said walls for substantially covering said open space;
(d) each of said walls having interior and exterior surfaces, and top and bottom edges;
(e) a plurality of reinforcing ribs disposed on one of said interior and exterior surfaces of a plurality of said walls;
(f) a plurality of generally vertically extending jack means interposed between said reinforcing ribs;
(g) said jack means extending from about the top edge to a predetermined distance towards the bottom edge of said plurality of said walls;
(h) said jack means being in length not more than about one-half the vertical length of one of said plurality of said walls;
(i) said jack means operably connected with said roof for vertically adjusting a position thereof relative to said walls;
(j) each said jack means including a reinforced high load bearing stanchion spaced about one-half the distance from said floor;
(k) each said jack means having said stanchion mounted adjacent a bottom of said jack means;
(l) said roof including a plurality of support members extending downwardly from a periphery thereof; and
(m) a first set of said support members is slidably received in said ribs and a second set thereof is operably connected with said jack means so that said roof moves up or down when said jack means is actuated.

4,887,861

UNDER DASH COVER

John E. Moch, 348 N. Bitterbush, Orange, Calif. 92668, and Ronald L. Jones, 1327 N. Poinsettia, Santa Ana, Calif. 92701

Filed Sep. 15, 1988, Ser. No. 244,741
Int. Cl.[4] B62D *25/14*
U.S. Cl. 296—70 **26 Claims**



1. In combination, a motor vehicle having a dashboard, an instrument panel with a ledge portion projecting away from the vehicle interior, and a metal wall separating the passenger section of the vehicle from the frontal cavity, an improvement comprising:

an under dash cover having an axially elongate body, formed to fit the contours of the area under the dashboard, proximate the instrument panel, said body having a outwardly facing surface, an inwardly facing surface, an upper edge and a lower edge;

at least one lip, connected to said body along the upper edge thereof, said lip adapted to rest on the ledge portion of the instrument panel, which is situated behind the instrument panel, under the dashboard;

a magnet, attached to said inwardly facing surface proximate said lower edge and adjacent one end of said body, said magnet adapted to engage the metal wall so as to help hold said under dash cover in place; and

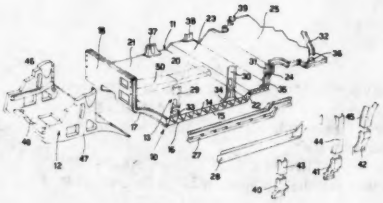
means for quickly releasably connecting said body at the floor board edge, said means for connecting including a tab portion and an associated mating connector.

4,887,862

BODYWORK FOR A VEHICLE, IN PARTICULAR FOR AN AUTOMOBILE, AND PROCESS FOR MANUFACTURING IT

Aldo Bassi, Milan, Italy, assignor to Alfa Lancia Industriale S.r.l., Arese, Italy

Filed Aug. 7, 1987, Ser. No. 82,503
Claims priority, application Italy, Aug. 7, 1986, 21440 A/86
Int. Cl.[4] B60R *27/00*; E04C *2/32*; B21D *35/00*
U.S. Cl. 296—204 **10 Claims**



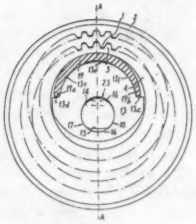
1. A bodywork for an automobile, said bodywork comprising a floor pan formed by a platform chassis, an upper framework and an auxiliary chassis, which are made integral with each other, said floor pan having a sandwich type structure formed by three overlapping metal sheets, two sheets of said metal sheets having configurations similar to each other, said two sheets having a portion of their lengths which are curved, a third sheet of said metal sheets being corrugated with crests of undulations, said third sheet being interposed between said two sheets, said crests being alternatively integrally attached with said two sheets.

4,887,863

CONTINUOUS JOINT FOR VEHICLE SEAT WITH AUTOMATIC CLEARANCE COMPENSATION

André Caillol, Paris, France, assignor to Tubauto, Levallois-Perret, France

Filed Dec. 3, 1987, Ser. No. 128,425
Claims priority, application France, Dec. 3, 1986, 86 16917
Int. Cl.[4] B60N *1/06*
U.S. Cl. 297—362 **9 Claims**



1. A continuous joint for a seat with an adjustable back comprising a fixed plate integral with the seat-part of the seat and a movable plate integral with the back, said plates being laterally secured to each other in confronting relationship, one of said plates being provided with a bearing aperture disposed about a central axis (46), an eccentric constituting a cam provided with a shaft (14) seated in said bearing aperture and rotatable about said central axis enabling the angular position of one of the two plates to be varied in relation to the other by partial engagement of at least two sets of teeth, one set of teeth integral with one of the two plates being centered on said central axis about which the eccentric constituting the cam

turns, and the other set of teeth being integral with a part driven by the eccentric constituting a cam in such a way as to displace around said central axis the partial engagement zone, wherein the eccentric constituting a cam (13, 22, 27, 36) has on its periphery, in the most eccentric zone in relation to the axis, an elastic bearing (19, 39) made of metal or metal alloy, integral with this eccentric constituting a cam and which is elastically held directly or indirectly against the driven face of the tooth part (4, 20, 21, 25, 28, 30, 44) driven by this eccentric constituting a cam, in such a way as to hold the set of teeth (3, 5) integral with this part against the other set of teeth (1, 6) in the partial engagement zone, and wherein the shaft is provided with two support zones (17–18, 37*a*–37*b*) to provide a reactive force to the force applied by said elastic bearing against the driven face of said tooth part, said support zones being angularly spaced 90–150 degrees apart on opposed sides of a plane containing the central axis and a diametral line symmetrically bisecting the partial engagement zone of said at least two sets of teeth.

4,887,864

MODULAR AUTOMOTIVE SEAT FRAME

Thomas Ashton, 4909 - 18th St. SE., Rochester, Minn. 55904

Filed Jul. 5, 1988, Ser. No. 215,323
Int. Cl.[4] B60N *1/02*
U.S. Cl. 297—375 **12 Claims**

1. An automotive seat framework comprising:

(a) a backrest frame including a plurality of frame members;

(b) a bench frame comprised of a plurality of frame members;

(c) first and second hinge arms, each including a first integral portion rigidly coupled adjacent one of a pair of axially opposed corners of the backrest frame and a second integral portion angulating at an obtuse angle from one end of said first portion and means for pivotally coupling said second portion adjacent to one of a pair of axially opposed corners of the bench frame forward of a rearmost end of the bench frame, and wherein at least one of said first and second hinge arms includes a third integral portion extending at an obtuse angle from the other end of said second portion; and

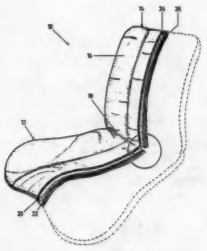
(d) means coupled between said third integral portion and the bench frame and including a longitudinal member mounting in parallel relation to a side of said bench frame and means for regulating the extension of said member for regulating the angle of said backrest frame relative to said bench frame.

4,887,865

ORTHOPEDIC SEAT AND BACKREST COMBINATION

Daniel Dawidzon, 63 Gordon Street, Tel Aviv, Israel

Filed Nov. 8, 1988, Ser. No. 268,600
Int. Cl.[4] B60N *1/02*
U.S. Cl. 297—382 **10 Claims**



1. An orthopedic seat and backrest combination device comprising:

a seat member formed of rigid material having a shaped contour providing recesses in a seating space defined above the surface thereof;

a back member formed of a rigid material having a shaped contour providing support for the lumbar lordosis region of the lower back; and

a flexible member stretchably connecting said seat and back members proximate respective rear and lower edges thereof such that in a flat orientation wherein said seat and back members lie substantially in the same plane, said respective rear and lower edges are disposed opposite one another,

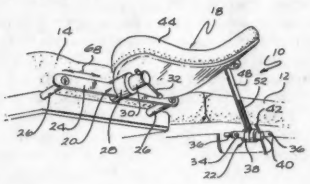
said flexible member providing interplay between said back member lower edge and said seat member rear edge to allow for adjustable orientation of said seat and back members within said seating space, enabling said back member lower edge to be disposed either above or behind said seat member rear edge, in accordance with the desired seating comfort of the user.

4,887,866

ADJUSTABLE ARMREST

Mark M. Rusin, Napa, Calif., assignor to Dexta Corporation, Napa, Calif.

Filed Nov. 12, 1987, Ser. No. 119,671
Int. Cl.[4] A47C *7/54*
U.S. Cl. 297—421 **7 Claims**



1. An adjustable armrest for use with a chair having a seat and a reclining back, including

a first rail member attached to the side of the chair back,

a second rail member attached to the side of the chair seat,

a first sliding member coupled to the first rail member for sliding along the first rail member and including first locking means for locking the first sliding member along the first rail member,

a second sliding member coupled to the second rail member

for sliding along the second rail member and including second locking means for locking the second sliding member along the second rail member,

an armrest located adjacent the side of the chair having a front attachment portion and a back attachment portion and having the back attachment portion of the armrest pivotably attached to the first sliding member for rotational movement about the first sliding member,

a pivot link having one end pivotable attached to the front attachment portion and the other end pivotably attached to the second sliding member for rotational movement about the second sliding member and armrest and wherein the pivot link is adjustable in length,

the first rail member formed by an elongated rectangular bar and attached to the chair back by posts located at the ends of the bar,

the second rail member formed by an elongated rectangular bar and attached to the chair seat by posts located at the ends of the bar,

the first sliding member formed as a cylindrical structure having a central axis perpendicular to the first rail member and with the first locking means located along the central axis thereof,

the second sliding member formed as a cylindrical structure having a central axis perpendicular to the second rail member and with the second locking means located along the central axis thereof and,

the adjustable pivot link slidably received by the second sliding member and with the second locking means of the second sliding member locking both the second sliding member along the second rail member and the adjustable pivot link along the second sliding member.

4,887,867

RANGING DRUM SHEARERS

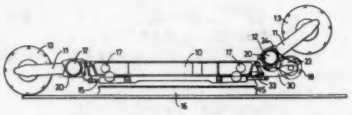
Alexander Porteous, Motherwell, and Angus J. McIntosh, Lanark, both of United Kingdom, assignors to Anderson Strathclyde PLC, Glasgow, Scotland

Filed Sep. 9, 1988, Ser. No. 242,197

Claims priority, application United Kingdom, Sep. 10, 1987, 8721325

Int. Cl.[4] E21C *27/01, 31/10*

U.S. Cl. 299—42 **8 Claims**



1. A ranging drum shearer, comprising a shearer body, at least one ranging arm carrying a cutter drum and mounted at at least one end of the shearer body, a transverse electric motor mounted on each ranging arm to drive the associated cutter drum, said electric motor being contained in a cylindrical shroud, a coal sizer pivotally mounted on the shroud and disposed at a selected height above a datum, means to maintain constant the disposition of the coal sizer in use relative to a conveyor below the body of the shearer when the ranging arm is raised and lowered, said means to maintain constant the disposition of the coal sizer relative to the conveyor comprising a position control arm longitudinally disposed and pivotally mounted at one end on the axis of the ranging arm, a keyway in said control arm containing a key on the axis of the coal sizer to provide for longitudinal movement of the coal sizer relative to the body of the shearer whereby on pivotal movement of the ranging arm and corresponding movement of the shroud, said control arm remains stationary and the distance between the key and the transverse axis of the shroud is maintained by longitudinal adjustment of the coal sizer in the keyway.

4,887,868

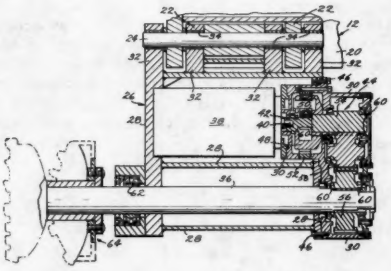
DUAL AUGER CONTINUOUS MINING MACHINE

Roger D. Plumley, Crab Orchard, W. Va., assignor to Fairchild International Inc., Glen Lyn, Va.

Filed Dec. 5, 1988, Ser. No. 279,940

Int. Cl.[4] E21C *1/00, 27/20, 29/22, 35/20*

U.S. Cl. 299—57 **15 Claims**



1. A continuous mining machine comprising

a cutter assembly suitable to be moved forwardly with respect to a mine face and transversely across the mine face, said cutter assembly including

a central frame,

a pair of side frames mounted on said central frame for independent pivotal movement about a pair of axes generally parallel with each other extending in a longitudinal direction corresponding generally to the forward direction of movement of the forward assembly with respect to the mine face,

an elongated shaft rotatably mounted on each of said side frames in generally parallel relation to the associated pivotal axis so as to extend longitudinally from a position adjacent the rearward portion of the associated side frame forwardly thereof to an extent such that a forward end portion of each shaft extends forwardly of the associated side frame,

a speed reducing unit mounted on each side frame between the associated shaft and the associated pivotal axis and drivingly connected with a rearward portion of the associated shaft,

an electric motor mounted on each side frame between the associated shaft and the associated pivotal axis forwardly of the associated speed reducing unit in driving relation thereto,

an auger cutter fixed to the forward end portion of each shaft,

power operated means between said central frame and each side frame for independently effecting movement of each side frame about its pivotal axis so as to swing the associated auger cutter about the associated pivotal axis in cutting relation to the mine material inwardly of the face so as to remove successive room sections therefrom in conjunction with the movements of the cutter assembly forwardly and across the mine face, and

means on said central frame for conveying the material cut from the mine face by said auger cutters rearwardly away from the mine face.

4,887,869

HYDRAULIC BRAKING SYSTEM

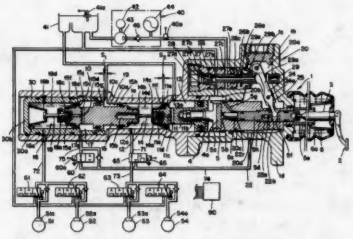
Michiharu Nishii, Toyota; Genji Mizuno, Toyoake; Yoshihiko Tada, Hazu; Yoshihisa Nomura, Toyota; Masahiko Kato, Nagoya; Kenji Shirai, Mishima, and Junichi Tanoue, Susono, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 19, 1988, Ser. No. 259,775

Claims priority, application Japan, Oct. 19, 1987, 62-263547

Int. Cl.[4] B60T *8/44*

U.S. Cl. 303—114 5 Claims



1. A hydraulic braking system comprising:
a tandem master cylinder having:
a bore with opposing open and closed ends,
a brake pedal,
a first piston slidably fitted in said bores so as to define a first pressure chamber and a first fluid chamber therein and operatively connected to said pedal through said open end,
a second piston slidably fitted in said bore so as to define a second pressure chamber adjacent to said first pressure chamber, and a second fluid chamber operatively connected to said first piston and a land on said piston acted on by pressure in a direction away from said closed end;
a first circuit through which fluid is supplied from said first pressure chamber to a first set of wheel cylinders, and
a second circuit through which fluid is supplied from said second pressure chamber to a second set of wheel cylinders;
a power source;
a hydraulic booster for regulating the pressure derived from said power source in response to the depression of said pedal and for supplying the resulting pressure to said second fluid chamber;
an anti-skid device for varying the pressure in said wheel cylinders during a skid condition; and
means for fluidly locking said second piston against movement towards said closed end upon a reduction of the pressure in said second pressure chamber during operation of said anti-skid device includes said land arranged to be acted on by the pressure from said hydraulic booster.

4,887,870

FEED PUMP FOR BRAKE SYSTEMS

Heinz Siegel, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

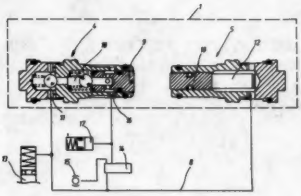
Filed Apr. 18, 1988, Ser. No. 182,596

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727174

Int. Cl.[4] F04B *11/00;* B60T *13/16, 17/02*

U.S. Cl. 303—116 16 Claims

1. A feed pump for brake systems including an anti-skid brake system, which comprises a first pump piston (9), said first pump piston (9) includes a cylindrical piston cylinder (18) which communicates on a pressure slide via a pressure line (8) with a cylindrical compensation piston cylinder (12), said cylindrical compensation piston cylinder is smaller than the cylindrical piston cylinder (18) of the pump piston (9), and a first compensation piston (10) associated with said compensation piston cylinder (12) is actuated in a shaft-driven manner counter-cyclically to the first pump piston (9), and said feed pump includes a second pumping piston (6) and a second compensation element (7), which are disposed facing respectively corresponding first pump piston (9) and first compensation element (10).



4,887,871

HYDRAULIC ANTI-LOCK BRAKING SYSTEMS FOR VEHICLES

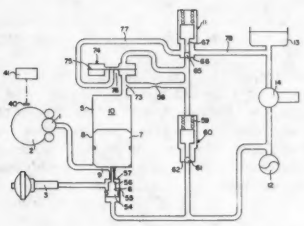
Denis J. McCann, Powys, Wales; Stuart B. Dawson, West Midlands, and Andrew J. Ward, Birmingham, both of England, assignors to Lucas Industries public limited company, Great Britain

Filed Feb. 21, 1989, Ser. No. 313,956

Claims priority, application United Kingdom, Feb. 24, 1988, 8804308

Int. Cl.[4] B60T *8/42*

U.S. Cl. 303—113 7 Claims



1. An hydraulic anti-lock braking system for vehicles comprising a brake on a wheel, a reservoir for fluid, a master cylinder providing a supply of brake-applying fluid to apply said brake, anti-lock means for sensing the behaviour of said wheel and emitting anti-lock signals, brake-pressure modulating means for controlling said supply of brake-applying fluid to said brake in accordance with the behaviour of said braked wheel, a solenoid-operated control valve incorporated in said modulating means and responsive to an anti-lock signal to cause said brake to be released by relieving hydraulic fluid to said reservoir, and fluid pressure means to cause said brake to be re-applied automatically following recovery of said wheel, re-application of said brake being initiated by said solenoid-operated control valve, wherein said solenoid-operated control valve incorporates a normally-closed exhaust valve for controlling the release of hydraulic fluid to the reservoir, said exhaust valve comprising an exhaust port, and a valve member controlling flow through said port, a pilot valve is adapted to provide communication to said reservoir through an exhaust passage of a size greater than that of said exhaust port, and a pressure-responsive member is adapted to control operation of said pilot valve, said pilot valve normally being biased into a closed position to close said exhaust passage but being movable

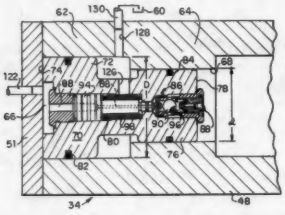
into an open position in response to a pressure drop across said pressure-responsive member, said pressure drop being established by said exhaust valve opening upon energisation of said solenoid.

4,887,872

TRACK ADJUSTER FLOW CONTROL MECHANISM

Carl P. Adams, Metamora; William J. Spivey, Jr., Joliet, and Thomas E. Oertley, Dunlap, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jan. 17, 1989, Ser. No. 297,644
Int. Cl.[4] B62D *55/30*
U.S. Cl. 305—10 **20 Claims**



1. A mechanism for controlling flow of fluid, comprising:

a fluid cylinder having walls defining first and second chambers said first chamber having a diameter D and said second chamber having a smaller diameter d;

a stepped piston having a first portion, a second portion, and a through bore, said first portion being positioned in and piloted by said first chamber, said second portion being positioned in and piloted by said second chamber, said piston being moveable within said first and second chambers;

means for sealing each piston portion relative to its associated cylinder wall; and

a valve assembly positioned within said stepped piston bore, said valve assembly having a fluid path therethrough and a pressure actuated closure member positioned within said fluid path and in fluid communication with said first and second chambers, said closure member being moveable by said valve assembly to an open position between said first and second chambers in response to fluid pressure in said first chamber being greater than fluid pressure in said second chamber, and to a closed position at which said fluid path between said first and second chambers is closed in response to fluid pressure in said second chamber being greater than the fluid pressure in said first chamber.

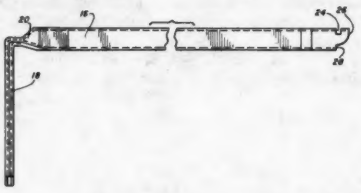
4,887,873

FILE SYSTEM WITH HANG RAIL

James Goedken, Muscatine, and Clayton Schmidt, Wilton, both of Iowa, assignors to Hon Industries, Inc., Muscatine, Iowa

Continuation of Ser. No. 108,785, Oct. 15, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,693
Int. Cl.[4] A47B *63/00*
U.S. Cl. 312—184 **5 Claims**

1. A hanging file support device for insertion into a drawer having a front wall with a slot and a back wall with supporting means, said device comprising a horizontal bar having a front end and a back end, said front end having a two-sided notch disposed on the upper side of said front end, said two-sided notch having a bottom between the sides; a vertical post at the back end of said horizontal bar; and interconnecting means between said vertical post and said horizontal bar; wherein said front end of said horizontal bar further includes a camming surface, said camming surface being of a configuration and dimensions to permit inspection of the front end of the horizontal bar into the slot of said front wall when the horizontal bar is at an inclined angle, and to cause the notch to straddle said front wall at the upper edge of said slot when the horizontal



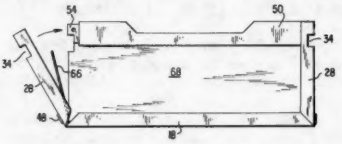
bar is in a horizontal position by engagement of said camming surface with the lower edge of said slot.

4,887,874

KNOCKDOWN DRAWERS AND BINS

Edward J. Joffe, 940 Park Ave., Linden, N.J. 07036

Filed Mar. 16, 1989, Ser. No. 324,465
Int. Cl.[4] A47B *43/00*
U.S. Cl. 312—258 **6 Claims**



1. A knockdown drawer and bin assembly comprising:

a one-piece molded plastic bottom and side panel unit having a rectangular bottom panel with upwardly extending side flanges, and a pair of side panels connected, respectively, to opposite sides of said bottom panel by reduced thickness hinge zones, each side panel having a side wall, end flanges projecting from the lateral edges of said side wall, said side flanges of said bottom panel and said end flanges of said side panels together forming the peripheral portions of the front and rear faces of the assembly in its erected configuration, and, adjacent each upper corner of said side panel, at least one projection attached to and extending inwardly from said end flange; and

front and rear panels, each of said front and rear panels being of one-piece molded plastic construction and each having, adjacent the upper corners thereof, at least one opening therein for reception of the corresponding one of said projections.

4,887,875

FIBER OPTIC CONNECTOR FOR USE IN TEMPORARY REPAIR OF MULTIPLE FIBER CABLE

Peter Chang, Lisle; Darrin J. Bergman, Naperville, both of Ill., and Donald W. Duda, Williams Bay, Wis., assignors to Amphenol Corporation, Wallingford, Conn.

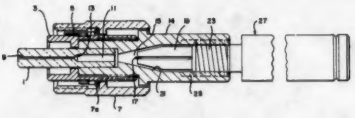
Continuation of Ser. No. 921,933, Oct. 20, 1986, abandoned. This application Apr. 25, 1988, Ser. No. 185,346
Int. Cl.[4] G02B *6/36*
U.S. Cl. 350—96.21 **8 Claims**

1. A fiber optic connector comprising:

a ceramic plug having a front end and a rear end, a plug passageway extending through said plug with said plug passageway sized to snugly receive a buffer stripped optical fiber therethrough in a manner extending out the front

end, said plug passageway having a size proximate the rear end such as to permit a portion of buffer covered optical fiber to the received therein;

a plug support supporting the rear end of the ceramic plug, said plug support having a plug support passageway coextensive with said plug passageway, a biasing wall surface in said plug support passageway at a location proximate to the rear end of said ceramic plug and a threaded inner wall portion along said plug support passageway;



chuck means having clamping means for holding a buffer covered fiber, said chuck means having a passageway extending therethrough coextensively with the plug support passageway whereby an optical fiber can be passed from the rear thereof therethrough into said ceramic plug, said chuck means having threads thereon such that it is engageable to the threads on said inner wall portion of said plug support in a manner such that said biasing wall surface engages said clamping means to cause said clamping means to securely seize a buffer covered fiber received therein.

4,887,876

ELECTRICAL CONNECTOR INCLUDING LIGHT-CONDUCTING MEANS

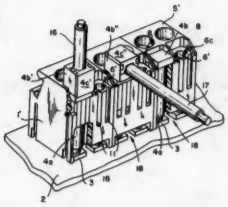
Herbert Fricke; Klaus Strate; Manfred Wilmes, and Arian Frikkee, all of Detmold, Fed. Rep. of Germany, assignors to C. A. Weidmueller GmbH & Co., Detmold, Fed. Rep. of Germany

Filed Nov. 7, 1988, Ser. No. 267,926

Claims priority, application European Pat. Off., Nov. 7, 1987, 87116480.2

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.2 **9 Claims**



1. An electrical connector adapted for connection with a conductor plate (2) and operable to indicate the status of a luminous diode (3) electrically connected with the plate, comprising:

(a) a connector body (1') adapted for mounting on the conductor plate in such a manner as to at least partially conceal the luminous diode, said connector body containing an internal passage (6') extending from said luminous diode to an exposed surface (5') of the body;

(b) light-conducting means including a first light-conducting member (4*a*) mounted within said passage and extending at one end adjacent said luminous diode for conducting light from said luminous diode to said exposed surface, said light-conducting means also including an auxiliary light-conducting member (16, 17); and

(c) a light-conducting cap member (4*b*', 4*b*'') arranged in light-conducting relation adjacent the other end of said first member that is remote from said luminous diode, said cap member being sectional and including a body section containing a recess (12) receiving one end of said auxiliary member in light-conducting relation relative to said other end of said first light-conducting member, said cap member also including a cover section (4*c*', 4*c*''), and means (13, 14) locking said cover section to said body section to maintain said auxiliary member one end in said recess.

4,887,877

OPTICAL DEVICES AND OPTICAL INTEGRATED CIRCUITS

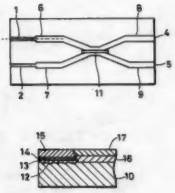
Hiroaki Inoue, Hachioji; Shinji Sakano, Kokubunji; Hitoshi Nakamura, Kanagawa; Toshio Katsuyama, Hachioji, and Hiroyoshi Matsumura, Saitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 916,704, Oct. 8, 1986, abandoned. This application Dec. 15, 1988, Ser. No. 285,367

Claims priority, application Japan, Oct. 9, 1985, 60-223709; Dec. 11, 1985, 60-276762

Int. Cl.[4] G02F *1/00, 1/19, 1/29;* **H01S** *3/101*

U.S. Cl. 350—96.11 **29 Claims**



1. An optical logic device comprising an X-type 2×2 reflecting optical switch having two input ends and two output ends; two light-emitting elements operatively coupled to respective said input ends of said optical switch; and means for selectively allowing light entering at least one of said input ends from respective light-emitting elements to emerge from at least one of said output ends in response to a signal applied to said optical switch, wherein optical guides fabricated on a semiconductor substrate couple said light-emitting elements to said input ends and form a region of intersection having a variable refractive index with said optical switch, whereby said means varies the refractive index of at least a part of said region in response to the signal applied to said optical switch, and said light-emitting elements and said optical switch are monolithically integrated on the semiconductor substrate.

4,887,878

OPTICAL MODULATION DEVICE

William C. Robinson, Concord, and Norman A. Sanford, Arlington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 620,626, Jun. 14, 1984, abandoned. This application Sep. 22, 1988, Ser. No. 247,940

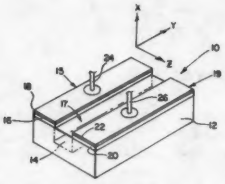
Int. Cl.[4] G02B *6/10*

U.S. Cl. 350—96.13 **12 Claims**

1. Apparatus for modulating electromagnetic carrier waves in the optical region of the spectrum, said apparatus comprising:

a waveguide including a planar substrate made of a ferroelectric, crystalline material having birefringent and electro-optic properties and having formed therein an elongated waveguide channel having a first section and at least two other sections branching off said first section and each ending as exit ports, said waveguide channel having throughout a higher index of refraction than that of said substrate along one crystallographic axis thereof so that said waveguide propagates in at least one mode a carrier

wave polarized parallel to said one crystallographic axis such that the optical power emerging from said branched ports of said waveguide is substantially equal; and



means for facilitating the selective changing of the amount of power emerging from said ports in correspondence with an information signal.

4,887,879

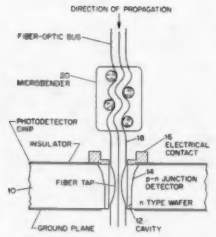
FIBER OPTIC TAP

Paul R. Prucnal, Princeton, N.J.; Stuart DS. Elby, and Edward E. Harstead, both of New York, N.Y., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Filed Jan. 25, 1988, Ser. No. 147,447

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.15 **17 Claims**



17. A passive optical tap for a single-mode optical fiber for optically transferring optical information from a source optically connected to said fiber to a light detector, which comprises:

a semiconductor wafer having a cavity etched from one surface of the wafer to another surface of the wafer;

detector means for converting light into an electrical signal, comprising a p-n junction detector on the inside surface of the cavity, and wherein an electroconductive metal is deposited on the opening of the cavity in electrical contact with the p-n junction;

microbender means for inducing cladding modes within the fiber;

optical coupling means for optically coupling the fiber to said detector means to couple energy from the induced cladding modes to the detector means, said optical coupling means comprising a reduced diametrical notch formed in the fiber said fiber notch being located in said wafer cavity.

4,887,880

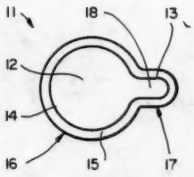
OPTICAL FIBER CONNECTOR STRUCTURE

Frank H. Levinson, Menlo Park, Calif., assignor to Raynet Corporation, Menlo Park, Calif.

Filed Aug. 31, 1988, Ser. No. 239,170

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.15 **20 Claims**



1. An apparatus for tapping an optical fiber, comprising:

an elongated first optical fiber having a noncircular end which has an end cross-section taken along a plane perpendicular to a longitudinal axis of the fiber which includes a throughput area and a light-add/light-drop area, a core of the throughput area being integral with a core of the light-add/light-drop area, the light-add/light-drop area and throughput area being enveloped by a common cladding;

an elongated second optical fiber having an end which has an end cross-section optically coupled to the first optical fiber end throughput area;

optical path means optically interconnecting the light-add/light-drop area and at least one of an electro-optic transducer and a sensor.

4,887,881

PLUGGING APPARATUS FOR THE TRANSMISSION OF ELECTRICAL ENERGY

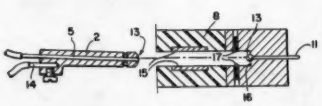
Peter Rütimann, Zug, Switzerland, assignor to Feller AG, Horgen, Switzerland

Filed Jul. 7, 1988, Ser. No. 216,196

Claims priority, application Switzerland, Aug. 24, 1987, 3235/87

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **6 Claims**



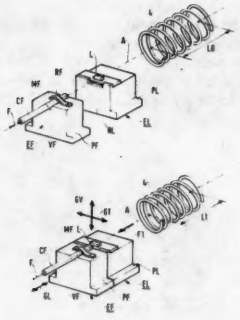
1. Plugging apparatus for transmission of both electrical energy and of optical information signals, comprising in combination, plug and socket members, each including a plurality of terminals for transmission of electrical energy and two light wave conductors for transmission of optical information signals, means locating each light wave conductor in said plug to extend therethrough to a terminal end for mating with said socket and wherein said light wave conductors are located in two of said terminals for transmission of electrical energy for respectively constituting outgoing and incoming information transmission conduits.

4,887,882

ALIGNMENT METHOD, IN PARTICULAR FOR OPTICAL COMPONENTS

Daniel Mousseaux, Palaiseau; Bruno Chevet, Paris, and Emmanuel Grard, Saint Michel sur Orge, all of France, assignors to Societe Anonyme dite : Alcatel Cit, Paris, France

Filed Jan. 27, 1989, Ser. No. 302,276
Claims priority, application France, Feb. 4, 1988, 88 01299
Int. Cl.[4] G02B *6/42*
U.S. Cl. 350—96.20 9 Claims



1. An alignment method in particular for optical components for the purpose of obtaining accurate and permanent alignment between a first component and a second component along a longitudinal direction, said method comprising the following operations:

orienting, positioning at least longitudinally, and permanently fixing said first and second components on first and second bases respectively, said bases having facing first and second transverse adjustment faces;

pressing said two adjustment faces against each other by applying a longitudinal thrust force;

applying transverse adjustment after said operation of pressing said faces together, thereby adjusting the relative transverse positions of said two components by applying transverse adjustment forces to at least one of said bases, said forces being limited but sufficient to cause said two adjustment faces to slide over each other; and

fixing the bases together after said operation of transverse adjustment in order to fix said bases together in permanent manner;

said method including the improvement whereby:

said thrust force is applied in controllable manner, said thrust force having a first value during said operation of transverse adjustment, said first value being sufficiently small to ensure that the friction forces opposing said relative sliding remain less than said limit on the adjustment forces;

said method then includes an operation of reinforcing the thrust by increasing said thrust force to a second value which is greater than said first value, thereby obtaining increased friction forces, said increase being performed sufficiently progressively to avoid inducing mutual displacement of said bases; and

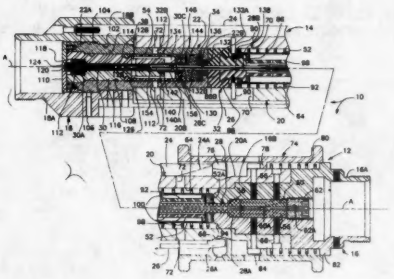
said operation of fixing the bases is performed after said operation of reinforcing the thrust and in such a manner that said increased friction forces prevent interferring displacements being induced by said fixing operation.

4,887,883

UNDERSEA WET-MATEABLE FIBER OPTIC CONNECTOR

Alexander L. Darbut, Edina, and Vernon C. Ralph, Brooklyn Center, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 20, 1988, Ser. No. 208,939
Int. Cl.[4] G02B *6/38*
U.S. Cl. 350—96.21 30 Claims



1. A wet-mateable fiber optic connector, comprising:

(a) a first mateable and dematable connector part including (i) a first housing portion, (ii) an actuatable latch means mounted to said first housing portion for movement between latching and unlatching positions, (iii) a first wand structure for receiving and stationarily holding therein a first optical fiber end portion and being mounted at its outer end portion to said first housing portion, (iv) first sealing and centering means for slideably receiving and holding an inner end portion of said first wand structure and being mounted to said first housing portion, and (v) first compensating means connected to said sealing and centering means for sealably containing an optical refractive index matching fluid about said inner end portion of said first wand structure and for equalizing the pressure of said index matching fluid therein with a fluid of the environment in which said connector will be submerged; and

(b) a second mateable and dematable connector part including (i) a second housing portion partially interfitted within said first housing portion of said first connector part when said parts are in a mated condition, (ii) means on said second housing portion being cooperable with said first housing portion for guiding said second housing portion into the mated condition with said first housing portion and for releasably latching said housing portions together to retain said parts in said mated condition, (iii) a second wand structure for receiving and stationarily holding therein a second optical fiber end portion and being mounted at its outer end portion to said second housing portion, (iv) second sealing and centering means mounted to said second housing portion for receiving and holding an inner end portion of said second wand structure and for receiving said inner end portion of said first wand structure to mount in axially aligned and abutting relation respective inner ends of said first and second wand structures and position in axially aligned and optically coupled relation respective ends of the first and second optical fiber end portions extending therein, without the necessity of moving either of said fiber end portions relative to said respective wand structures which stationarily hold said fiber end portions therein, when said parts are brought into said mated condition, and (v) second compensating means for sealably containing an optical refractive index matching fluid about said inner end portion of said second wand structure, said axially aligned and abutting inner ends of said wand structures and said axially aligned and optically coupled optical fiber end portions and for equal-

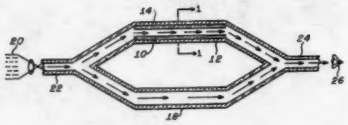
izing the pressure of said index matching fluid therein with the environmental fluid in which said connector will be submerged.

4,887,884

CAPILLARY NON-LINEAR OPTICAL WAVEGUIDE DEVICE

L. M. Hayden, Lakeland, Minn., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Feb. 23, 1989, Ser. No. 314,022
Int. Cl.[4] G02B 6/02; G01B 9/02; H03F 7/04; F21V 9/14
U.S. Cl. 350—96.29 **9 Claims**

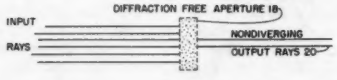


1. An electro-optic waveguide device, comprising:
an optically transparent capillary having first and second ends, a substantially centrally disposed bore, and a first refractive index,
an organic thermosetting medium having an intrinsic centrosymmetric molecular organization, disposed within said capillary, and having an additive substance poled by exposure to an electric field while in a fluid state to exhibit non-linear optical response and to provide a second refractive index greater than said first refractive index after removal from the influence of said electric field and said medium has solidified,
means for applying a further electric field to said capillary, thereby to vary said second refractive index in accordance with a predetermined second order susceptibility and the magnitude of said further electric field,
optical input means for coupling electromagnetic radiation to one of said first or second ends, and
optical output means for coupling at least a portion of said electromagnetic radiation from one other than said one of said first or second ends.

4,887,885

DIFFRACTION FREE ARRANGEMENT

James E. Durnin, and Joseph H. Eberly, both of Rochester, N.Y., assignors to University of Rochester, Rochester, N.Y.

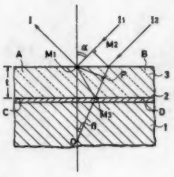
Continuation-in-part of Ser. No. 915,187, Oct. 3, 1986. This application Aug. 4, 1987, Ser. No. 81,394
Int. Cl.[4] G21K 1/06; H01S 3/08
U.S. Cl. 350—162.11 **16 Claims**

1. A system for generating a well defined traveling wave radiation beam not subject to beam spreading in the sense that the intensity pattern of the traveling wave radiation beam in a transverse plane is substantially unaltered by propagation over a range which is substantially larger than the Rayleigh range of a Gaussian beam with equal central spot width, said system generating a traveling wave radiation beam the amplitude of which has its transverse dependence substantially identical to $J_m(\alpha\rho)$, the m^{th} order Bessel function of the first kind, wherein α is a geometrical constant and ρ designates the transverse radial coordinate of the wave, and further wherein the Bessel function argument is independent of the distance z of the propagation, which results in a well defined traveling wave beam not subject to beam spreading, said generating means comprising a pumped resonant cavity for the amplification of radiation for establishing a state of resonant amplification and emission of radiation therein, and a radiation element forming a part of the resonant cavity for directly forming an output radiation beam the amplitude of which has its transverse dependence substantially identical to said $J_m(\alpha\rho)$, the m^{th} order Bessel function of the first kind from said resonant cavity, which results in the generation of the well-defined traveling wave radiation beam.

4,887,886

COLORED ARTICLES WITH INTERFERENCE LAYERS MADE OF A COMPOSITE OF SILICON DIOXIDE AND SILICON CARBIDE

Toshio Shimizu, and Kouji Hirose, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Aug. 31, 1987, Ser. No. 91,280
Claims priority, application Japan, Sep. 2, 1986, 61-206527
Int. Cl.[4] G02B 1/10, 5/28; B32B 9/00
U.S. Cl. 350—166 **14 Claims**



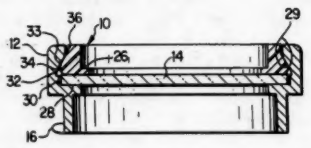
1. A colored article in which a light permeable coating layer having a nitride, oxide or carbide of at least one of the elements belonging to the groups IIIb, IVa, IVb, Va and VIa of the periodic table alone or in a composite state is formed on a reflection surface of a predetermined reflectance formed on a member, and wherein the coating layer comprises SiC and SiO_2 in a composite state of a thickness of 200 to 3000 Å, and the SiO_2 ingredient ratio is 5 to 80% by weight to provide a color by light interference.

4,887,887

LENS RETAINER FOR OPTICAL ELEMENT

Richard T. Hart, Garland, Tex., assignor to Varo, Inc., Garland, Tex.

Filed Jun. 7, 1988, Ser. No. 203,331
Int. Cl.[4] G02B 7/02
U.S. Cl. 350—252 **8 Claims**



8. An optical element accessory for use in a night vision goggle, comprising:
an optical element holder attachable to the night vision goggle, said holder comprising a ledge for supporting the optical element, and a wall extending axially from said ledge for retaining said element radially;
a groove in said holder;
an optical element insertable into said holder; and
an endless retainer ring dimensioned to snap into said groove in said holder to secure said element between said ring and

said holder and prevent radial and axial movement of said element, said groove comprising a generally cylindrical portion extending axially from said wall, and a bevelled surface extending axially and radially inwardly from said cylindrical portion to facilitate insertion of said ring therein.

4,887,888

OBJECTIVE LENS DRIVING DEVICE

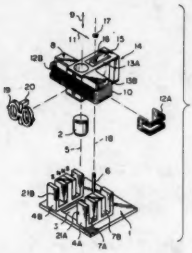
Hiroyasu Nose, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 933,333, Nov. 20, 1986, Pat. No. 4,818,066, which is a continuation of Ser. No. 692,630, Jan. 18, 1985, abandoned. This application Feb. 6, 1989, Ser. No. 306,384

Claims priority, application Japan, Jan. 30, 1984, 59-13469; Jan. 30, 1984, 59-13470; Jan. 30, 1984, 59-13471; Sep. 18, 1984, 59-195365

Int. Cl.[4] G02B 7/04; G11B 7/08

U.S. Cl. 350—247 8 Claims



5. An objective lens driving device, comprising:

a holding member for holding an objective lens; an intermediate support member constructed for rotation about a rotary support axis spaced apart from the optic axis of said objective lens and parallel to said optic axis;

parallel plate springs having one end thereof secured to said holding member and the other end thereof secured to said intermediate support member, said parallel plate springs supporting said holding member for movement only in the direction of the optic axis of said objective lens relative to said intermediate support member; and

driving means for driving said holding member in the direction of the optic axis of said objective lens and a direction perpendicular to said optic axis, said driving means including first and second coils fixed to said holding member and having effective portions, respectively, a magnet for generating a magnetic field crossing said effective portions and means for flowing a current to said effective portions, the directions of the optic axis of said objective lens, the magnetic field crossing said effective portion of said first coil, and the current flowing in said effective portion of said first coil being perpendicular to one another, and the directions of the magnetic field crossing said effective portion of said second coil and the current flowing in said effective portion of said second coil, and said direction perpendicular to said optic axis being perpendicular to one another.

4,887,889

ORGANOPOLYSILOXANES EXHIBITING NONLINEAR RESPONSE

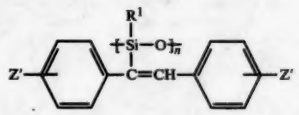
Thomas M. Leslie, Clinton Township; Hunterdon County, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Feb. 3, 1988, Ser. No. 172,302

Int. Cl.[4] G02B 5/20

U.S. Cl. 350—311 6 Claims

1. An electrooptic light modulator device with an organic nonlinear optical component comprising a transparent solid medium of a polymer which is characterized by a recurring structural unit corresponding to the formula:



where R^1 is a hydrocarbyl substituent containing between about 1–12 carbon atoms; n is an integer of at least 5; and Z' is an electron-donating or electron-withdrawing substituent.

4,887,890

CONTROLLED TRANSPARENCY

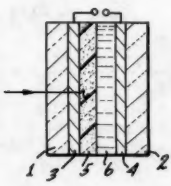
Werner Scherber, Bermatingen, and Thomas Meisel, Meersburg, both of Fed. Rep. of Germany, assignors to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Dec. 21, 1987, Ser. No. 135,595

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643690

Int. Cl.[4] G02F 1/17

U.S. Cl. 350—357 11 Claims



1. Pane or foil with controllable transparency and light transmission comprising:

at least one transparent carrier;

a first and a second transparent electrode; said first electrode being disposed on said one carrier;

a transparent electrolyte and an active polymer layer disposed on said first electrode, said active polymer layer having a light absorption in the visible spectrum range characterized by a variation in the case of a reversible chemical reaction being an electrochemically induced doping process;

a transparent ion layer made of ITO and being disposed such that the electrolyte is situated between the ion layer and the active polymer layer, the ion layer serving as a reversible ion receiving and ion storage layer as well as a yielding source for ions respectively to receive such ions from the polymer layer and to provide such ions to the polymer layer; and

said second electrode being disposed so that the electrolyte and the polymer layer is between the electrodes.

4,887,891

ZOOM LENS SYSTEM FOR USE IN MICROFILM PROJECTION APPARATUS

Toshihiko Ueda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 16, 1988, Ser. No. 168,662

Claims priority, application Japan, Mar. 20, 1987, 62-64388

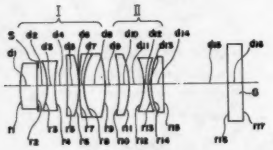
Int. Cl.[4] G02B 15/14, 5/04

U.S. Cl. 350—427 10 Claims

1. A zoom lens system comprising from the enlargement side to the reduction side:

a first lens group of a positive refractive power having an aperture stop and being movable along the optical axis in

an operation of zooming, the first lens group including, from the enlargement side, a positive lens unit having at least one positive lens element, a biconcave lens element, a positive lens element and a positive compound lens unit composed of a negative lens element and a positive lens element cemented together; and



a second lens group of a negative refractive power being movable along the optical axis in the operation of zooming, the second lens group including, from the enlargement side, a positive meniscus lens element having a concave surface on the enlargement side, a biconcave lens element and a positive lens element.

4,887,892

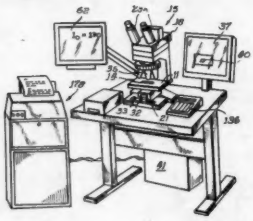
METHOD AND METHOD AND APPARATUS FOR CONTROL OF LIGHT INTENSITY FOR IMAGE ANALYSIS

James W. Bacus, Hinsdale, Ill., assignor to Cell Analysis Systems, Inc., Lombard, Ill.

Continuation-in-part of Ser. No. 927,285, Nov. 4, 1986, which is a continuation-in-part of Ser. No. 794,937, Nov. 4, 1985, Pat. No. 4,741,043. This application Apr. 8, 1987, Ser. No. 35,822

Int. Cl.[4] G02B *21/08;* G06K *9/28;* G01N *33/48;* H04N *7/18*

U.S. Cl. 350—523 **8 Claims**



1. An apparatus using a light microscope for image analysis comprising:

a CCD sensor having pixels receiving transmitted light having passed through the specimen and background light and for providing an optical density value based on received light at each pixel,

a light source for illuminating a slide having a specimen thereon,

means to adjust the light source to control the intensity of light being applied to the specimen on the slide and to the CCD sensor,

a field iris for receiving light from the light source and a control means for adjusting the size of the field aperture in the field iris,

a condenser optics means including a variable condenser iris which is adjusted to control the amount of light passing therethrough from the cone of light having passed through the field iris,

a means for adjusting the variable condenser iris between a wide open and a substantially closed position,

said condenser optics means being movable in a 37 Z" direction to adjust the focus of the light passing from the lenses and iris,

means for supporting a slide having a specimen for receiving background light on one side of the slide and for providing transmitted light and background light on the opposite side of the slide for application to the face of the CCD sensor,

means to fix the condenser iris at a predetermined size to assist in reducing the intensity and amount of light to a relatively constant amount with a limited amount of light scatted at the face of the CCD sensor,

a computer connected to the CCD sensor to provide measured values of the background light, and

a monitor connected to the computer for displaying the actual value of the background light so that the operator may adjust the means for adjusting the intensity of the light source to provide a numerical constant value for the background light.

4,887,893

PERISCOPE WITH ONE PIECE HOUSING AND MIRROR HOLDING ELEMENTS

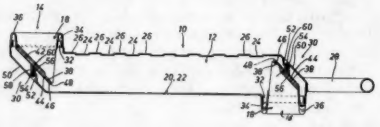
Lennart Dahlgren, Askims Utsiktsväg 10, S-436 00, Askim, Sweden

Filed Mar. 11, 1988, Ser. No. 166,703

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 8703771

Int. Cl.[4] G02B *23/08, 23/22*

U.S. Cl. 350—618 **8 Claims**



1. A toy periscope, comprising:

(A) an elongated housing formed in one piece of blow molded plastic material, said elongated housing comprising:

(a) first and second opposite end portions and first and second side surfaces;

(b) an inlet opening at said first end portion; and

(c) an outlet opening at said second end portion;

(B) a first mirror holding element fitted within said inlet opening, and a first deflection mirror within said first mirror holding element; and

(C) a second mirror holding element fitted within said outlet opening, and a second deflection mirror within said second mirror holding element; and wherein:

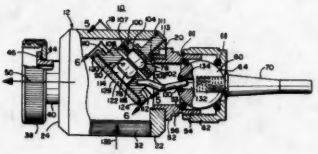
said inlet opening has a flange projecting from said first side surface, said outlet opening having a flange projecting from said second side surface, said first mirror holding element engaging said flange of said inlet opening, said second mirror holding element engaging said flange of said outlet opening; and

said first mirror holding element has an inverted collar edge engaging said flange of said inlet opening, said second mirror holding element having an inverted collar edge engaging said flange of said outlet opening.

4,887,894
BEAM DEFLECTOR

Boris Gluzerman, Chicago; Nicholas Lakatos, Des Plaines, and Paul W. Hensler, Lake Bluff, all of Ill., assignors to Edward Weck Incorporated, Princeton, N.J.

Filed Feb. 6, 1989, Ser. No. 306,721
Int. Cl.[4] G02B 5/08
U.S. Cl. 350—636 7 Claims



1. A beam deflector for deflecting a beam of emitted energy from a first path to one of a plurality of second paths which are disposed to impinge upon a target working area comprising:

a housing enclosing a chamber, said housing having a first port in a first side for receiving said beam into said chamber along said first path and a second port in a second side through which said beam exits said chamber along one of said second paths;

deflecting means within said chamber for intersecting said first beam and deflecting said first beam along anyone of said plurality of second paths;

control means coupled to said deflecting means for remotely moving said deflecting means from outside said chamber whereby any of said second paths can be selected, said deflecting means comprising:

a first ball element mounted in a first socket which socket is rotational throughout a preselected angular range about a first axis only through said first ball element;

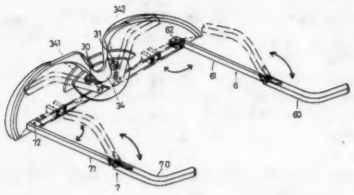
a second ball element attached to said first ball element mounted in a second socket for rotational movement throughout a preselected angular range about a second axis only through said second ball element, said second socket attached to said housing; and

a mirror element carried by said first socket and disposed to intersect said first path.

4,887,895
FOLDING GLASSES

Ming-Her Tzeng, No. 106, Kang-Dong Village, Hsi-Kang Shiang, Tainan Hsien, Taiwan

Filed Feb. 2, 1989, Ser. No. 305,089
Int. Cl.[4] G02C 5/08, 7/10, 11/02
U.S. Cl. 351—63 4 Claims



1. A folding glasses comprising:

a head-engaging frame member having:

a pair of spaced lenses;

a bridge member having a frontal plate and a rear plate sandwiching inner portions of the lenses, and means for hingedly securing stacked portions of the frontal plate, the lenses and the rear plate, respectively, and a nose-engaging member having an engaging portion for resting on the wearer's nose, attached to an inner side wall of the rear plate;

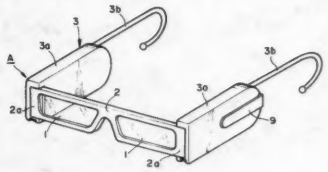
a pair of temples having a pair of side bars with one end of the either bar hingedly attached to an outer portion of an inner side wall of the lenses, and a pair of terminal sections hingedly attached to other ends of the side bar and swingable between a wearing position and a folded position under the respective side bars; and

a pair of lens covers corresponding in shapes to the lenses, and hingedly mounted respectively on the lenses to be swung between a horizontal position and a dependent position via a connecting means.

4,887,896
HANDY SPECTACLES

Terumi Akagi, Tokyo, Japan, assignor to Aoyama Gankyo Kabushiki Kaisha, Sabae, Japan

Filed Sep. 29, 1988, Ser. No. 250,699
Claims priority, application Japan, Oct. 5, 1987, 62-151694
Int. Cl.[4] G02C 5/08
U.S. Cl. 351—63 4 Claims



1. Spectacles comprising:

a front frame supporting a pair of lenses and having opposite longitudinal ends;

a pair of temples, each having a sheath, and each sheath having two opposite ends, an axial passage way provided in one of the opposite axial ends and a second axial passageway provided in the opposite axial end, and an ear stem retractable into and out of the second axial passageway, and the frame being retractable into and out of the first axial passageway; and

sliding pivotal connection means disposed in the first axial passageway for pivotally and slidably connecting each sheath to the opposite ends of the frame to thereby permit the sheaths to pivot relative to the frame and slide over the frame when the sheaths are pivoted into alignment with the frame.

4,887,897
EYE EXAMINING APPARATUS

Noriyuki Nose, Tokyo, and Yukichi Niwa, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 94,895, Sep. 10, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,225
Claims priority, application Japan, Sep. 16, 1986, 61-217817
Int. Cl.[4] A61B 3/02, 3/10
U.S. Cl. 351—233 13 Claims

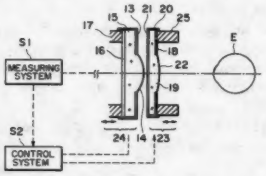
1. An eye examining apparatus comprising:

an eye examining lens of an elastic material opposed to an eye to be examined;

control means for causing a marginal portion of said eye examining lens to protrude or sink to thereby change a lens surface of said eye examining lens;

said control means including an opening member having an opening operably associated with a central portion of said eye examining lens such that when said opening member is moved in the direction of an optic axis of said eye examin-

ing lens the surface of the marginal portion of said lens is deformed; and



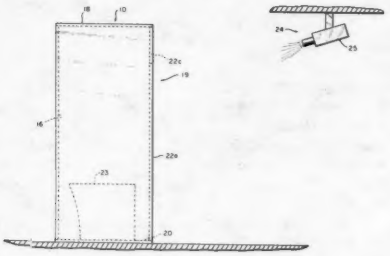
a measuring machine for measuring the amount of movement of said opening member in the direction of the optic axis.

4,887,898

FABRIC PROJECTION SYSTEM

Harold H. Halliburton, Roanoke, and Mark S. Moseley, Vienna, both of Va., assignors to Rowe Furniture Corporation, Arlington, Va.

Filed Apr. 13, 1988, Ser. No. 180,998
Int. Cl.[4] G03B *21/00*
U.S. Cl. 353—28 **16 Claims**



1. An image display system for projecting image patterns onto a three-dimensional object comprising:

a shadow box for containing a full-scale white three-dimensional object including at least two side walls, a top wall, a rear wall, and a bottom wall surrounding an open viewing area, and wherein the inner faces of the side walls, the rear wall, and the top face of the bottom wall are painted black; and

a projection system positioned at a distance from the shadow box including a projector and a plurality of image patterns for projection onto the three-dimensional object, said image patterns being viewable on said three-dimensional object at a distance from said shadow box and at any position in front of said open viewing area of said shadow box.

4,887,899

APPARATUS AND METHOD FOR ELECTRONIC ANALYSIS OF TEST OBJECTS

Yau Y. Hung, 625 Cambridge Dr., Rochester, Mich. 48063

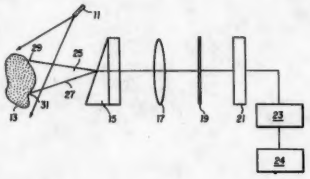
Filed Dec. 7, 1987, Ser. No. 129,709
Int. Cl.[4] G01L *1/24*; G01B *9/02*
U.S. Cl. 356—35.5 **19 Claims**

1. A method for nondestructively analyzing a test object, comprising the steps of:

(a) directing coherent radiation onto a test object,

(b) passing radiation reflected from the object through a birefringent material and then through a polarizer,

(c) directing radiation emerging from the polarizer onto a detector, the birefringent material and the polarizer cooperating to form a random interference pattern on the detector, and storing the random interference pattern thus formed,



(d) stressing the object, and repeating steps (a), (b), and (c) while the object is stressed, and

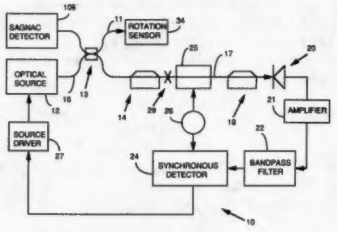
(e) electronically comparing the random interference patterns formed while the object is in the stressed and unstressed conditions.

4,887,900

POLARIZATION MAINTAINING FIBER INTERFEROMETER AND METHOD FOR SOURCE STABILIZATION

David B. Hall, La Crescenta, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Feb. 20, 1987, Ser. No. 17,430
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—350 **28 Claims**



1. A device for stabilizing the frequency of an optical signal output from a optical source, comprising:

a length of polarization maintaining optical fiber for guiding an optical signal while maintaining the polarization thereof;

means for introducing an optical signal having a pair of linear polarization components from the light source into the length of polarization maintaining optical fiber, the polarization components having different propagation times therein;

fiber optic phase modulator means for modulating at a reference frequency the phase difference of the two linear polarization components guided by the length of polarization maintaining optical fiber;

means for producing an error signal indicative of the intensity as a function of the reference frequency of an optical signal output from the length of polarization maintaining optical fiber; and

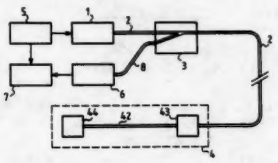
means for applying the error signal to the optical source to servo the frequency of the optical signal output from the optical source to a predetermined value.

4,887,901

OPTICAL FIBER DETECTION SYSTEM USING AN INTENSITY-MODULATING SENSOR

Lucien G. Falco, Cressier, and Olivier M. Parriaux, Lausanne, both of Switzerland, assignors to Centre Suisse D'Electronique Et De Microtechnique S.A., Switzerland

Filed Jul. 24, 1986, Ser. No. 888,889
Claims priority, application France, Jul. 30, 1985, 85 11616
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—352 6 Claims



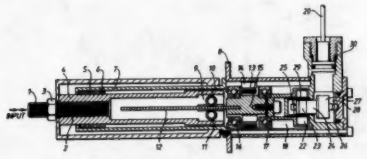
1. An optical system for sensing a variation in a physical or chemical parameter comprising:
light source means for producing a light signal;
means for amplitude modulating said light signal at a modulation frequency to produce a modulated light signal;
optical fiber means, connected to said light source mans and said means for modulating for guiding said modulated light signal;
at least one sensor connected to said optical fiber means, each sensor comprising transducer means and resonant cavity means for producing a variation in phase of said modulated light signal at said modulation frequency; and
detecting means, optically coupled to said optical fiber means;
wherein:
said amplitude modulating is high frequency modulation;
said transducer means produce a variation in intensity of said modulated light signal responsive to said variation in said physical or chemical parameter;
said resonant cavity resounds at said high frequency modulation;
said variation in phase of said modulated light signal is responsive to said variation in intensity; and
said detecting means, optically coupled to said optical fiber means, detects said variation in said phase of said modulated light signal at said high frequency modulation.

4,887,902

OPTICAL TRANSDUCER

Alexander Skinner, Southampton, United Kingdom, assignor to Plessey Overseas Limited, Ilford, England

Filed Feb. 11, 1988, Ser. No. 154,705
Claims priority, application United Kingdom, Feb. 11, 1987, 8703127; Jun. 5, 1987, 8713193
Int. Cl.[4] G01B 11/00
U.S. Cl. 356—373 8 Claims



1. A linear to rotary transducer comprising:
(a) a linearly movable input structure;
(b) rotation restraining means for preventing rotation of the input structure;
(c) a rotatable output structure including permanently biased torsion spring means embodying an elongate torsion spring strip; and,
(d) a linearly movable connection provided along said elongate torsion spring strip and located between the linearly movable input structure and the torsion spring strip so that the linearly moveable connection can move towards or away from the rotatable structure in order to vary the effective location of the rotatable output structure within an active part of the torsion spring means and thereby produce proportional rotation of the rotatable output structure.

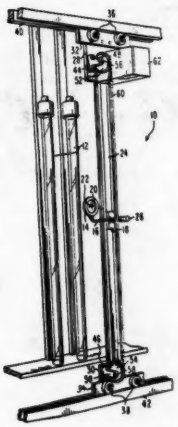
6. A linear to rotary transducer as claimed in claim 1, in which the rotatable output structure is mounted by ball bearings and is connected to a carrier for a diffraction grating mirror through a magnetic coupling arrangement which enables the carrier to rotate with the rotatable output structure and by such rotation a beam of light emerging from an optical fibre and impinging on the diffraction grating mirror will be spectrally filtered in dependence upon the angular position of the rotatable output structure and reflected into another optical fibre.

4,887,903

APPARATUS FOR READING HEIGHT OF MEASUREMENT COLUMN

Frank D. Frisco, Kendall Park; Raymond J. Kadash, Woodbridge, and Keith B. Silverman, New Brunswick, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 2, 1987, Ser. No. 115,488
Int. Cl.[4] G01B 11/00, 11/02
U.S. Cl. 356—372 12 Claims



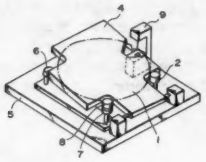
1. An apparatus for automatically determining the height of an object in a vertical column comprising:
means for sighting the position of the object;
means for moving said sighting means vertically along said column; and
means for converting the vertical movement of the sighting means to an electrical signal corresponding to the height of the object in the column.

4,887,904

DEVICE FOR POSITIONING A SEMI-CONDUCTOR WAFER

Hiroshi Nakazato, Ohme; Takashi Matsumura, Yokohama; Takahiro Akamatsu, Machida, and Kenji Fukui, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 898,223, Aug. 20, 1986, abandoned.
This application Jul. 22, 1988, Ser. No. 222,297
Claims priority, application Japan, Aug. 23, 1985, 60-183969; Aug. 23, 1985, 60-183970; Aug. 23, 1985, 60-183971; Aug. 23, 1985, 60-183974
Int. Cl.[4] G01B *11/14, 11/27;* B65G *47/24*
U.S. Cl. 356—375 15 Claims



1. A device for detecting a position of an edge of a disk-like workpiece having an outer periphery whose shape includes a portion bearing positional information related to the workpiece, said device comprising:

driving means for rotationally moving the workpiece;

illuminating means; and

photodetecting means having an elongated light receiving surface;

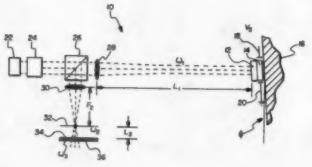
wherein said illuminating means and said photodetecting means are disposed so as to sandwich therebetween an outer peripheral portion of the workpiece when it is rotationally moved by said driving means and wherein said illuminating means projects, toward said photodetecting means, a light beam having an elongated shape in cross-section and wherein the direction of elongation of the shape of the light beam substantially agrees with the direction of elongation of said light receiving surface of said photodetecting means.

4,887,905

ASSEMBLY AND METHOD FOR MONITORING THE ALIGNMENT OF A WORKPIECE

Jerold B. Lisson, Henrietta, and Richard A. Stark, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 19, 1988, Ser. No. 212,814
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—363 20 Claims



1. An assembly utilizing radiation for monitoring alignment of a workpiece, the assembly comprising:

(a) first element means for reflecting at least a portion of radiation incident thereupon at a first incident angle, said first element means capable of reflecting the radiation at a first reflection angle different from said first incident angle when the incident angle is not substantially normal to the reflection angle;

(b) second element means for reflecting at least a portion of radiation incident thereupon at a second incident angle, said second element means reflecting the radiation at a second reflection angle substantially equal to said second incident angle;

(c) means for applying an electrical signal to the second element means for generating a known phase shift in the radiation reflected at the secod reflection angle; and

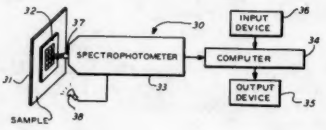
(d) detector means for receiving the radiation reflected from said first element means and the radiation reflected from said second element means, and generating at least one signal indicative of the alignment of the workpiece with respect to a reference.

4,887,906

COLOR MATCH PREDICTABILITY SYSTEM AND METHOD

Clarence Koehler, 62 Summit Dr., Denville, N.J. 07834

Filed Apr. 11, 1988, Ser. No. 179,769
Int. Cl.[4] G01J *3/50*
U.S. Cl. 356—402 11 Claims



1. A color matching system for determining a colorant formulation comprising:

means for analyzing a color sample to determine its color spectrum;

means for determining from said spectrum a color match formulation from a set of predetermined colorants;

means for determining a quality index related to the quality of the match of said formulation; and

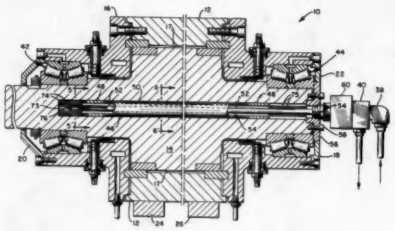
means for modifying said color sample a plurality of predetermined measured amounts.

4,887,907

ROTARY EXTRUDER WITH INTERNALLY COOLED ROTOR

Granville J. Hahn, and Sammy K. Flud, both of Big Spring, Tex., assignors to Permian Research Corporation, Big Spring, Tex.

Filed May 3, 1989, Ser. No. 347,152
Int. Cl.[4] B01F *15/06*
U.S. Cl. 366—99 3 Claims



1. An internally cooled rotor for a rotary extruder, said rotor comprising means at each end thereof for rotatably mounting said rotor in said extruder and a substantially cylindrical plasticizing section disposed therebetween, said rotor further comprising: an axial bore extending substantially through said rotor, said bore defined by a substantially cylindrical wall; a sleeve disposed within said bore; a conduit disposed within said

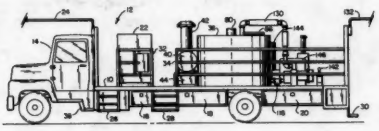
sleeve; a first annulus between said conduit and said sleeve; a second annulus disposed between said sleeve and said wall, said second annulus being disposed radially inward from said plasticizing section and the length of said second annulus being substantially coextensive with the length of said plasticizing section; means for providing fluid communication between said conduit and said first annulus; means for selectively introducing and discharging a coolant through said conduit and said first annulus; and means adjacent each end of said sleeve for contacting coolant circulated through said conduit and said first annulus with said wall of said bore.

4,887,908

MOBILE ASPHALT CRACK SEALANT APPARATUS

Darryl R. Montgomery, 3109 Amity Rd., Hilliard, Ohio 43026, and David C. Raber, 10999 Converse Rd., Plain City, Ohio 43064

Filed Mar. 23, 1988, Ser. No. 172,295
Int. Cl.[4] B01F *15/06*; B67D *5/62*
U.S. Cl. 366—149 **15 Claims**



1. A mobile sealant apparatus comprising a frame adapted for vehicular movement and bearing:

(a) a jacketed vessel for housing heated, fluid sealant material, said vessel having a jacket bearing tubes in the sidewall and bottom thereof for indirectly heating the jacketed vessel;

(b) in-line heating means for heating fluid heating media;

(c) a first line connecting said heating means to the jacket tubes of said jacketed vessel, and a second line connecting said jacket tubes to said heating means;

(d) pump means for passing said heating media from said heating means to said jacket tubes via said first line for circulating heating media through said jacket tubes in heat-exchange relationship with said vessel for heating said sealant material housed therein, and for recirculating said heating media back to said heating means from said jacket tubes via said second line;

(e) a sealant outlet line attached to said vessel for withdrawing heated sealant material from said vessel;

(f) a thrid line connecting said jacket tubes and said sealant outlet line, and thence back to said jacket tubes for indirectly heating said sealant outlet line by heating media recirculating in said third line by said pump means; and

(g) sealant material pump means attached to said outlet line for transporting heated sealant material for its use.

4,887,909

BLENDER WITH THERMALLY INSULATED CONTAINER

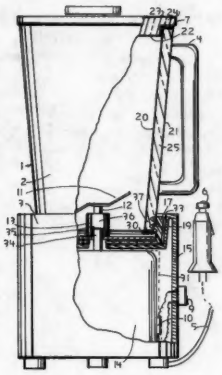
James R. Bennett, Fort Lauderdale, Fla., assignor to Thermo Blender Inc., Sebastian, Fla.

Continuation-in-part of Ser. No. 848,630, Apr. 7, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,021
Int. Cl.[4] B01F *7/00, 7/16*
U.S. Cl. 366—199 **5 Claims**

1. A thermally insulated blender container for use in conjunction with a conventional blender base and a mounting attachment bearing rotary cutting blades, said blender container comprising:

a vertical central chamber having an open top and an open bottom, said chamber defined by a pair of concentric, enclosing vertical walls, said pair of vertical walls including a rigid inner wall and a rigid outer wall, said outer wall spaced apart from said inner wall by a thermally insulated space of a thickness greater than that of said inner and said outer wall and having a thermal conductivity less than that of said walls;

said open top having lid-engagement means for engagement of a sealing top lid; and



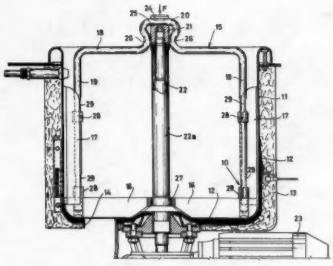
said open bottom having a round configuration and provided with external thread means for removable engagement of said mounting attachment to thereby provide an insulated blender using existing blender equipment.

4,887,910

BLADE MIXER DEVICE FOR FLUID PRODUCTS CONTAINED IN A CYLINDRICAL TANK

Genesio Bravo, Alte Di Montecchio Maggiore, Italy, assignor to Bravo S.p.A., Vincenza, Italy

Filed May 2, 1988, Ser. No. 188,962
Claims priority, application Italy, May 8, 1987, 20432 A/87
Int. Cl.[4] B01F *7/16*
U.S. Cl. 366—312 **4 Claims**



1. A blade mixer device for fluid products contained within a cylindrical tank of the type having therein an axially extending operating shaft, comprising

a portal element removably mounted on said operating shaft, and supporting at least a first and a second pair of blades acting, respectively, on the bottom wall and the annular side wall of said tank,

said portal element having an upper horizontal section the mid portion of which is shaped as a saddle,

said operating shaft having a grooved head fixed to the top thereof,

said saddle being removably engaged with a pair of grooves

formed transversely in said head in staggered relation one with respect to the other, whereby said saddle is removably restrained on said head by said grooves, and

said saddle including diametrally opposed, lateral bends which rest against said head.

4,887,911

DEVELOPER MIXER FOR ELECTROPHOTOGRAPHIC COPYING MACHINE

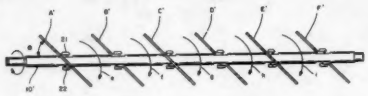
Takashi Miyaji, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 120,229, Nov. 10, 1987, abandoned, which is a continuation of Ser. No. 869,326, Jun. 2, 1986, abandoned. This application Sep. 30, 1988, Ser. No. 253,319

Claims priority, application Japan, Jun. 21, 1985, 60-94746

Int. Cl.[4] B01F *7/10*; G03G *15/08*

U.S. Cl. 366—316 2 Claims



1. A developer mixer comprising a shaft rotatably mounted in a developer tank and a plurality of planar fins each having a generally fanshaped grooved section, said fins being mutually parallel and affixed to said shaft obliquely, said grooved sections of each mutually adjacent pair of said fins being at opposite directions with respect to said shaft, each of said fins having a plurality of notches along the periphery thereof.

4,887,912

STAND-UP BAG

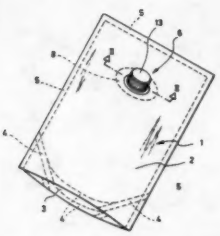
Friedrich Stumpf, Meckesheim, Fed. Rep. of Germany, assignor to Indag Gesellschaft fur Industriebedarf m.b.H., Heidelberg, Fed. Rep. of Germany

Filed Jan. 19, 1989, Ser. No. 298,956

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 8800575[U]

Int. Cl.[4] B65D *39/08*

U.S. Cl. 383—66 7 Claims



1. A stand-up bag made of a heat-weldable sheet material, said bag comprising:

a front face and a rear face connected to one another along their edges,

a reclosable threaded closure provided on one of said faces, said reclosable threaded closure including a pipe socket formed with screw threads for engagement with screw threads of a removable screw cap,

said pipe socket of said threaded closure penetrating the bag and having its inner end secured to an inner wall surface of the bag with the aid of a welding flange,

said welding flange having a chamfered outer rim which forms with said inner wall surface a radially outwardly opening v-shaped circumferential groove, and

said groove being at least partially filled by a sealing layer formed by melting during the welding operation.

4,887,913

BAG FOR INFUSION SOLUTIONS AND THE LIKE AND METHOD OF MANUFACTURING THE SAME

Karl-Heinz Sengewald, 4801 Halle, Westf. 1, Fed. Rep. of Germany

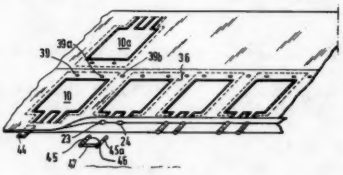
Continuation of Ser. No. 770,001, Aug. 26, 1985, Pat. No. 4,709,534, which is a continuation of Ser. No. 471,140, Mar. 1, 1983, abandoned. This application Jul. 15, 1987, Ser. No. 73,485

Claims priority, application Fed. Rep. of Germany, May 15, 1982, 3218415

The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.

Int. Cl.[4] B65D *30/00*

U.S. Cl. 383—96 38 Claims



1. A hose for manufacturing bags for infusion solutions and the like, comprising an elongated hose element of a synthetic thermoplastic foil formed in aseptic condition and having two wall portions; a plurality of bags each having a body part and at least one connecting part which are of different widths and shapes and formed in said hose by a shaped welding which extends within said hose always through said two wall portions of said hose and over an entire shaped contour of said body part and said connecting part of each of said bags, and so that said connecting parts face toward one longitudinal edge of the hose; a plurality of shaped cuts in said hose extending outwardly around said shaped welding seam of each of said bags and around said body part and said connecting part which are of different widths and shapes through said walls of said hose; a single cut in said hose at the side of the one longitudinal edge, which opens said connecting parts; and a plurality of plugs each inserted in one of said connecting parts to close the same.

4,887,914

AEROSTATIC BEARING WITH AN ADJUSTABLE STABILIZING STRUCTURE

Yuh-Wen Lin, and Ying-Wen Jan, both of Hsin Chu, Taiwan, assignors to Industrial Technology Research Institute, Taiwan

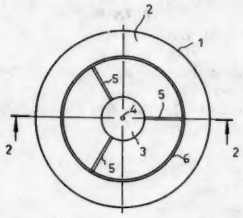
Filed Oct. 26, 1988, Ser. No. 268,151

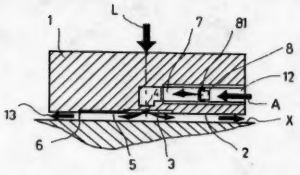
Int. Cl.[4] F16C *32/06*

U.S. Cl. 394—12 4 Claims

1. An aerostatic bearing with an adjustable stabilizing structure comprising a bearing body having a plane, said plane being furnished with a pocket and a first orifice being in communication with an intake passage furnished in said body; a movable spacing member with a second orifice being mounted, inside said passage, whereby a cavity being formed in said passage between said first orifice and said second orifice for regulating the intake velocity and the air volume, and said

plane being furnished with a ring-shaped groove around said pocket and a plurality of radial grooves being connected be-





tween said pocket and said ring-shaped groove so as to increase the working area said pocket and to reduce the total volume of the same.

4,887,915

SLIDE SYSTEMS

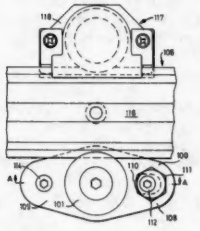
Gervase L. Forster, Jordons, England, assignor to Hepco Slide Systems Limited, Middlesex, United Kingdom

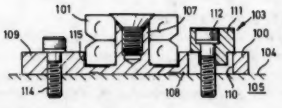
Filed Mar. 18, 1988, Ser. No. 169,898

Claims priority, application United Kingdom, Mar. 26, 1987, 8707244

Int. Cl.[4] F16C *29/12*

U.S. Cl. 384—57 **9 Claims**





1. A mounting device for a bearing, comprising:

a carrier plate having means for securing said device to a substantially planar surface of a substrate, said means for securing comprising a first lateral extension of said carrier plate;

a spigot for supporting said bearing, said spigot being fixed to said carrier plate; and

means for adjusting said device in a plane substantially parallel to said planar surface of said substrate, said means for adjusting comprising a second lateral extension of said carrier plate diametrically opposite said first lateral extension, an elongate hole formed through said second lateral extension of said carrier plate, and an eccentric bush disposed in said elongate hole, said eccentric bush being rotatably secured to said planar surface of said substrate.

4,887,916

CLAMPING PLATE FOR THE RETENTION OF SELF-ALIGNING FRICTION BEARING

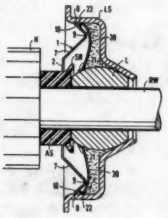
Peter Adam, Höchberg; Ferdinand Hoffmann, Hemer, and Michael Rüb, Würzburg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,548

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 8712959

Int. Cl.[4] F16C *23/04;* H02K *5/16;* F16F *1/34*

U.S. Cl. 384—192 **6 Claims**



1. A clamping plate for retaining self-aligning friction bearings in an electric motor, comprising:

a circular body with a central seating hole and a clamping rim formed on said body, said circular body having a larger diameter than said seating hole;

spring tabs connected to said rim and pointing radially inward and being offset in a direction opposite to a predetermined plug-in direction of the body; and

said clamping rim having a limiting bead over which said spring tabs are inwardly bent.

4,887,917

WHEEL MOUNT AND METHOD OF CONNECTING THE PARTS OF A WHEEL MOUNT

Manfred Tröster, Bad Kissingen, and Heinrich Hofmann, Schweinfurt, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Continuation of Ser. No. 17,355, Feb. 24, 1987, abandoned. This application Feb. 27, 1989, Ser. No. 326,421

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1986, 3608346

Int. Cl.[4] F16C *13/00, 43/04;* B21K *1/40*

U.S. Cl. 384—543 **11 Claims**

1. A wheel mount assembly, comprising:

(A) a wheel hub, said wheel hub having a periphery and an axial end;

(B) an anti-friction bearing, said anti-friction bearing including an inner ring, said inner ring of said anti-friction bearing being carried by said periphery of said wheel hub, said inner ring of said anti-friction bearing having a side; and

(C) a part which is welded to said wheel hub, said part having an axial end; and

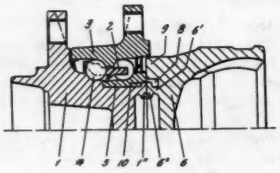
wherein said wheel hub includes a projection which projects in an axial direction toward said part, said projection of

said wheel hub being radially inward of said inner ring of said anti-friction bearing; and

wherein said part includes a projection which projects axially toward said projection of said wheel hub to meet said projection of said wheel hub; and

wherein said wheel mount assembly is assembled by:

(a) assembling said projections together end to end such that said projections have a combined axial length sufficient to space said axial end of said wheel hub from said axial end of said part;



(b) welding said projections together by heating said projections;

(c) deforming said heated projections without directly conducting the heat of said welding step through said projection of said wheel hub to said inner ring of said anti-friction bearing; and

(d) prestressing said inner ring of said anti-friction bearing by pressing said projection of said part against said side of said inner ring of said anti-friction bearing during said deforming step.

4,887,918

DRAWN CUP ROLLER BEARING

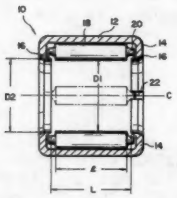
Takayuki Kawachi, Mino, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 65,873, Jun. 24, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,193

Claims priority, application Japan, Dec. 19, 1986, 61-194422

Int. Cl.[4] F16C *33/58*

U.S. Cl. 384—560 **8 Claims**



1. A drawn cup roller bearing comprising an annular outer ring made of a thin steel sheet, and a number of rollers arranged closely side by side on the internal peripheral annular space of the annular outer ring wherein each of the rollers has at each of the ends an end projection having a concave side wall and a generally trapezoidal vertical cross section with the greatest diameter smaller than the diameter of the roller, inside flanges are integrally formed at the axially opposite ends, respectively, of the annular outer ring with an inwardly projecting roller-retaining edge being formed at and along each of the free ends of said inside flanges, thereby forming an internal peripheral annular space in the outer ring capable of retaining the rollers closely side by side in a filled-up fashion at their end projections supported by said inwardly projecting roller-retaining edges, and a roller-inserting groove is permanently formed in at least one of the inwardly projecting roller-retaining edges extending through to an inner and radial surface; and wherein the roller-insertting groove has a portion with a cross section slightly smaller than the smallest diameter of the end projection of the roller.

4,887,919

PREVENTING MOVEMENT OF AN ARTICLE ALONG A SHAFT OR BORE

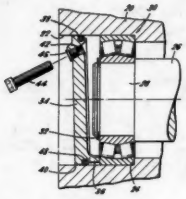
Ronald F. Hamblin, Luton, England, assignor to SKF (U.K) Limited, England

Filed Jan. 2, 1986, Ser. No. 815,566

Claims priority, application United Kingdom, Jan. 8, 1985, 8500396

Int. Cl.[4] F16R *2/00*

U.S. Cl. 384—562 **7 Claims**



1. An assembly comprising a housing having a bore with a longitudinal axis, an article which is positioned in the bore and a device which is also positioned in the bore and which prevents movement of the article along the bore in the direction from the article to the device, the device comprising a non-circular element disposed entirely within said bore and frictionally engaging the interior wall of said bore which element during assembly can be moved along the bore and then caused to adopt a position in which it engages the article at one or more locations and engages the bore at two or more locations without deformation of said bore, said element having a minor axis no greater than the diameter of said bore and having a major axis greater than the diameter of said bore, the two or more locations of engagement with the bore lying in a first plane extending perpendicular to a second plane in which lies the longitudinal axis of the bore, the first plane forming an angle with a third plane extending perpendicular to the longitudinal axis of the bore which is greater than zero but no greater than $\tan^{-1}\mu$, where μ is the coefficient of friction between the bore and the element.

4,887,920

PUNCTUATION CHECK FEATURE FOR AN ELECTRONIC TYPEWRITER

Doris J. McRae, Danbury, Conn., and Richard E. Roberts, Cortland, N.Y., assignors to Smith Corona Corporation, Cortland, N.Y.

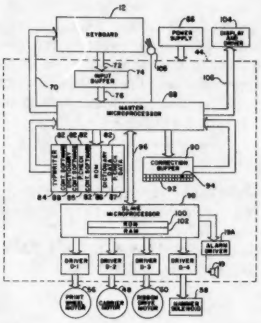
Filed Jan. 5, 1988, Ser. No. 141,030

Int. Cl.[4] B41J *5/30*

U.S. Cl. 400—63 **12 Claims**

1. A punctuation checking system for use in an electronic typewriter having a keyboard including a plurality of character and function keys selectable for issuing unique signals, a platen, a carrier, a printing machanism including a print hammer supported on said carrier for printing characters at selected print positions on a recording medium supported on said platen, a correction mechanism for erasing previously printed characters from the recording medium, bi-directional feeding means for horizontally moving the carrier relative to the platen, electronic processor means for receiving the unique signals from selected keyboard keys and for controlling functional operation of the typewriter mechanisms in acordance with the signals received, storage means for storing characters representing punctuation marks and for storing signals repre-

senting contextual signals related to punctuation marks, and means 85 for examining the relationship between said punctuation mark signals and said contextual signals including said electronic processor means, said examining means determining



if the relationship between said punctuation mark characters and said contextual signals correspond to a predetermined set of rules, and alarm means actuated by said electronic processor means if said rules are violated.

4,887,921

DOT PRINTER HAVING MEANS FOR DISCHARGING STATIC ELECTRICITY FROM THE INK RIBBON

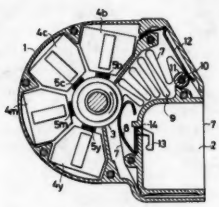
Mikio Hayashi, and Fumio Otsuka, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1983, Ser. No. 559,950

Claims priority, application Japan, Dec. 10, 1982, 57-217283

Int. Cl.[4] B41J *32/02*

U.S. Cl. 400—196.1 **19 Claims**



1. In a dot printer including a printing head connected by means of a conductive supporting plate to a carriage slidably received on guide shafts, and a ribbon cassette having a case which contains an ink ribbon and being installed in a predetermined position on said carriage, the improvement comprising: means for electrically grounding said supporting plate; and a conductive leaf spring disposed within said case of said ribbon cassette so as to be in resilient contact with said ink ribbon, said leaf spring having an integral protruding element which extends toward the exterior of said case and which is in resilient contact with said supporting plate so as to discharge static electricity generated on said ribbon to side supporting plate.

4,887,922

PAPER FEEDING DEVICE FOR PRINTERS

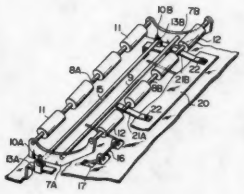
Atsushi Satake, and Hajime Hirose, both of Chofu, Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 802,407, Nov. 27, 1985, abandoned. This application Sep. 23, 1988, Ser. No. 248,382

Claims priority, application Japan, Nov. 30, 1984, 59-254777

Int. Cl.[4] B41J *13/036*

U.S. Cl. 400—637 **1 Claim**



1. In a printing apparatus including a frame, an intermittently rotating platen with a paper thereon, a printing device, and a tractor unit which forcedly transfers a paper to the platen in synchronization with platen rotation using sprocket holes in the paper, said printing apparatus comprising:

(a) a shaft fixed beneath and in parallel with a platen;

(b) a pair of roller support sheets, one placed beneath each end of the platen, said sheets each having an oblong hole for slidably receiving said shaft, and supporting therebetween two sustaining shafts, each with at least two presser rollers rotatably thereon, and said sheets holding therebetween a spring-stopper shaft running parallel to said two sustaining shafts;

(c) a torsion spring with one end fixed to said frame and another end engaged with said spring-stopper shaft such that said torsion spring tends to bias said pair of roller-support sheets upward and said presser rollers against the circumference of said platen;

(d) a plate spring with one end fixed to said frame and another end engaged with one of said sustaining shafts such that said presser rollers are lifted upward against the platen; and

(e) a switch lever with one end rotatably sustained at said frame and another end engaged with said torsion spring;

wherein turning said switch lever in one direction causes said torsion spring to engage with said spring-stopper shaft such that said presser rollers press the platen, and turning said switch lever in another direction causes said torsion spring to disengage from said spring-stopper shaft such that one of said at least two presser rollers disengages from the platen but another of said at least two presser rollers is maintained against the platen by the plate spring.

4,887,923

PLATEN ROLL

Takumi Ishiwaka; Yukio Andoh, both of Yokohama; Michiyuki Yamaguchi, Fuchu; Shosuke Suzuki, Kamakura; Yoshinori Egashira, Kodaira; Takeo Yokobori, Kamakura, and Takashi Ohashi, Yokohama, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Jun. 8, 1987, Ser. No. 59,302

Claims priority, application Japan, Jun. 10, 1986, 61-132669; Oct. 13, 1986, 61-241462; Nov. 5, 1986, 61-261788; Apr. 3, 1987, 62-80989; Apr. 10, 1987, 62-86757; Apr. 10, 1987, 62-86758

Int. Cl.[4] B41J *11/04*

U.S. Cl. 400—659 **1 Claim**

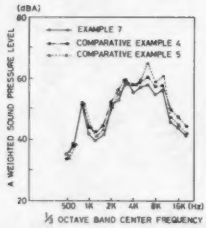
1. A platen roll which comprises a metallic shaft as a core and a surrounding component, wherein said surrounding component is selected from the group consisting of:

(A) a single layer comprising a rubber composition concentrically and tightly applied around said core, and

(B) two layers comprising (i) an inner layer of a resin concentrically and tightly applied around said core and, (ii) an outer layer of a rubber composition concentrically and tightly applied around said inner layer,

wherein said rubber composition comprising the single layer comprises:

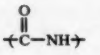
(1) a composition containing 100 parts by weight or less of carbon based on 100 parts by weight of total rubber, and



30–70% by weight of a natural rubber or an isoprene rubber,

(2) a composition comprising a thermoplastic elastomer, or

(3) a composition containing (i) at least one member selected from the group consisting of a styrene-butadiene copolymer rubber, an acrylonitrile-butadiene copolymer rubber, a butyl rubber and a halogenated butyl rubber, and (ii) at least one member selected from the group consisting of a polystyrene resin, a phenolic resin, a reinforced rubber composition comprising a vulcanizable rubber on which short fiber of a thermoplastic polymer having a



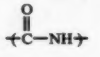
group in the molecule is grafted through a phenolformaldehyde resin precondensate and a copolymer comprising a conjugated diolefin-ethylenically unsaturated carboxylic acid and another vinyl monomer,

wherein said rubber composition comprising the single layer has a 5% stretch tensile modulus of 200–500 kg/cm^2, a tan δ of 0.15–0.50 at 100 Hz, $\pm$0.3% strain and a dynamic storage elastic modulus of 600–1800 kg/cm^2,

wherein the rubber composition comprising the outer layer of the two layers comprises:

(1') a composition comprises at least one selected from the group consisting of an ethylene-propylene copolymer rubber, a polybutadiene rubber selected from the group consisting of a 1,2-polybutadiene resin, a polyurethane rubber, a natural rubber, a polyisoprene rubber and a styrene-butadiene copolymer rubber, a polychloroprene rubber, a polyacrylate rubber and a polynorbornane rubber,

(2') a composition comprising (i) at least one member selected from the group consisting of a nature rubber, a polyisoprene rubber, a styrene-butadiene copolymer rubber, a polychloroprene rubber, an ethylene-propylene copolymer rubber and a polybutadiene rubber, and (ii) a reinforced rubber composition comprising a vulcanizable rubber on which short fiber of a thermoplastic polymer having a thermoplastic polymer having a



group in the molecule is grafted through a phenolformaldehyde resin precondensate, wherein the content of the short fiber of the thermoplastic polymer in the rubber composition is 2–30 parts by weight per 100 parts by weight of total rubber component or

(3') a composition comprising (1), (2) or (3) above

wherein the rubber composition comprising the outer layer of the two layers has a 5% stretch tensile modulus of 200–500 kg/cm^2 and a tan δ of 0.15–0.50 at 100 Hz, $\pm$0.3% strain, and wherein the resin of the inner layer of the two layers is a foamed or non-foamed thermoplastic resin or thermosetting resin, wherein the non-foamed resin has a flexural modulus of 20,000–150,000 kg/cm^2 and the foamed resin has a flexural modulus of 15,000–35,000 kg/cm^2.

4,887,924

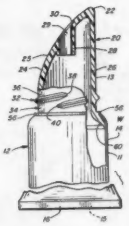
ANGLED TIP APPLICATOR

Richard K. Green, Western Springs, Ill., assignor to 501 Blistex Inc., Oak Brook, Ill.

Filed Feb. 19, 1988, Ser. No. 157,857

Int. Cl.^{4} A47L *13/30*; B43K *9/00*

U.S. Cl. 401—261 **33 Claims**



1. An angled tip emollient applicator comprising an upper rigid hollow tip;

a collapsible annular container having a generally cylindrical wall forming a pliable tube having a sealed bottom end;

said rigid tip having a base secured to the upper end of the tube and having a vertical wall and an angled wall truncating said vertical wall;

said angled wall having a curvilinearly convex shape in a longitudinal direction;

a multi-lead external thread encircling said base;

discharge opening located in said angled wall; and

said pliable tube communicating with said opening and depending from said base, and weld-connected thereto and forming a relatively rigid transition region adapted for grasping by the user thereby preventing deformation of the tube prior to removal of the cap and preparatory to application of emollient after removal of the cap;

said tube being expandable to draw excess emollient into the tube attendant to the user releasing pressure thereon.

4,887,925

PRONG AND TANG BINDING SYSTEM

Charles T. Groswith, III, Los Altos, and Edwin A. Seipp, III, Menlo Park, both of Calif., assignors to Taurus Holdings, Inc., Mountain View, Calif.

Filed Aug. 26, 1988, Ser. No. 237,016

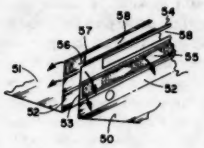
Int. Cl.^{4} B42F *13/08*

U.S. Cl. 402—15 **3 Claims**

1. An improved prong/tang-type sheet retainer binding system for binding marginally perforated paper sheets, said binder system comprising a prong/tang-type sheet retainer with a base member and at least two prongs/tangs; at least one marginally apertured paper sheet; at least one cover member with said cover member having a first marginal edge with apertures therein and said prongs/tangs being passed through

the apertures in said sheet and then passed through the apertures in said cover marginal edge; the portions of said prongs/tangs extending outwardly from said cover apertures being bent to lie in the plane of said marginal edge to bind the sheet to said cover member; a first imperforate marginal edge extension extending from said marginal edge; adhesive means on one face of said imperforate extension; and wherein said marginal edge extension is foldable to overlie said bent prongs/tangs and said adhesive means can adhere said marginal edge extension against said bent prongs/tangs to cover said bent prongs/tangs and to stiffen said binding system, the improvement comprising:

said at least one cover member, said apertured marginal edge and said marginal edge extension being integral with each



other and formed from a continuous integral sheet of bendable cover member material of uniform thickness and wherein said cover member material is foldable at the transition between said cover member and said apertured marginal edge and between said apertured marginal edge and said marginal edge extension;

said binder system further comprising a first slotted marginal edge extension extending from said imperforate marginal edge extension, said second marginal edge extension having at least one elongated generally rectangular slot sized to accommodate said bent prongs/tangs and being foldable against said imperforate marginal edge extension and then being foldable with said imperforate marginal edge extension into the plane of said marginal edge extension to surround said bent prongs/tangs.

4,887,926

TORQUE TRANSMITTING COUPLING FOR REELS AND THE LIKE

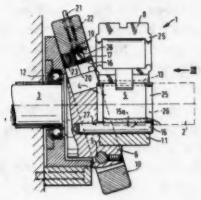
Udo Kunz, Dornhaldenstrasse 16, D-7850 Lörrach-Hauingen, Fed. Rep. of Germany, assignor to Udo Kunz, Lorrach-Hauingen, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 272,235

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 3822106

Int. Cl.[4] B25G *3/00*

U.S. Cl. 403—27 **39 Claims**



1. A coupling comprising a rotary driving member including a sleeve defining socket having a lateral inlet; a gate movable between open and closed positions in which said inlet is respectively accessible and blocked, and a wheel pivotable between operative and inoperative positions in which said gate is respectively maintained in and is movable to and from said closed position, said sleeve and said socket extending axially beyond said wheel in the operative position of said wheel; and a driven member having an end portion insertable into and removable from said socket by way of said lateral inlet in the open position of said gate.

4,887,927

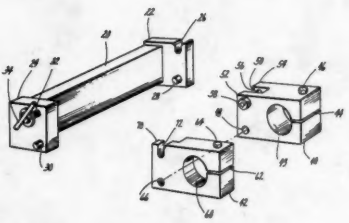
QUICK DISCONNECT APPARATUS FOR A LOADER BOOM

Irvin D. Bond, 10270 Allen Rd., Clarkston, Mich. 48016

Filed Feb. 16, 1988, Ser. No. 156,411

Int. Cl.[4] F16B *7/04*; F16L *3/08*

U.S. Cl. 403—68 **3 Claims**



1. Apparatus for releasably suspending a tubular boom from a support, comprising:

a body connected to the support, the body having first slot means open at one side of the body;

a first block and a second block mounted on the boom in a spaced relationship;

a first hanger pin carried on the first block and adapted to be received transversely in said first slot means;

the second block having second slot means open at one side of the second block;

a threaded second hanger pin carried on the body, and receivable transversely in the second slot means, whereby the first and second blocks and the tubular boom are suspended from the body at such times as the first hanger pin on the first block is received in the first slot means, and the second hanger pin is received in the second slot means;

the threaded second hanger pin being colinearly aligned with the first hanger pin when the boom is suspended from the body; and

means carried on the threaded second hanger pin for releasably clamping the second block to the body upon rotation of the threaded second hanger pin;

a detent pin carried on the body and a complementary pin-receiving opening carried on one of said blocks, the detent pin being receivable in the pin-receiving opening by a motion of the block with respect to the opening parallel to the longitudinal axis of the pin to a position in which the pin is operative to prevent pivotal motion of the block about the axis of rotation of the threaded second hanger pin.

4,887,928

DEVICE FOR A SCREW CONNECTION BETWEEN TWO PIECES

Gérard Issard, and Michel Boissonnet, both of Thiers, France, assignors to Wichard, Thiers, France

Filed Sep. 6, 1988, Ser. No. 240,691

Claims priority, application France, Sep. 4, 1987, 87 12712

Int. Cl.[4] F16B *1/00*; F16D *1/00*; F16G *11/00*

U.S. Cl. 403—287 **6 Claims**

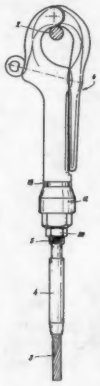
1. A device for forming a screw connection between a first piece and a second piece, said device being adapted and constructed to regulate the distance between said pieces, said device comprising:

a first piece fitted with a threaded shank;

a second piece comprising a cylindrical connecting section having a free end and a connected end;

said connection section including, in succession from said free end, a chamfered zone, a cylindrical zone, a groove, and a cylindrical part, said second piece having a central bore for the receipt therein of said threaded shank of said first piece;

a retaining ring made of an incompressible material, the exterior profile of said retaining ring corresponding to the exterior profile of the bottom of said groove of said second piece, and the cross-section of which is equal to twice the cross-section of said groove;



a connector ring having an interior face, said interior face of said connector ring including, in succession, a threaded opening of the diameter of said threaded shank of said first piece, a smooth zone of the diameter of the cylindrical part of said second piece, a groove having a depth which varies axially between a wide part equal to the thickness of said retaining ring and a narrow part of half the thickness of said retaining ring considered in the radial direction, and a zone of the diameter of said cylindrical part of said second piece; and

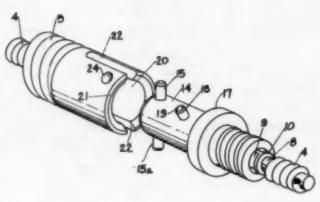
means for effecting the axial locking of said connector ring in relation to said second piece in a position in which the retaining ring is engaged simultaneously in said groove of said second piece and in the narrow part of said groove in said connector ring.

4,887,929

CABLE COUPLER

C. David Hale, Wilmington, Ohio, assignor to Electric Eel Manufacturing Co., Inc., Springfield, Ohio

Filed Apr. 25, 1988, Ser. No. 185,985
Int. Cl.[4] F16B 7/00
U.S. Cl. 403—328 **5 Claims**



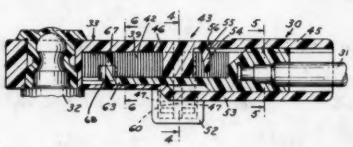
1. A cable coupler assembly comprising male and female coupler members, said female coupler member having a cylindrical wall at one end thereof defining an open ended socket, a pair of diametrically opposite linear slots in said cylindrical wall extending axially of said cylindrical wall in parallel relation to each other, said slots being open at the open end of said socket and closed at their opposite ends, at least one annular opening in said cylindrical wall, said annular opening being angularly disposed with respect to said linear slots, said male coupler member having a cylindrical body of a size to be slidably received in the socket in said female coupler member, a diametrically opposed pair of rigid drive pins projecting outwardly from said cylindrical body, said drive pins being of a size to be slidably received in the linear slots in said female coupler member, a spring-biased locking pin having a head projecting outwardly from the cylindrical body of said male coupler member, said locking pin being angularly displaced with respect to said rigid drive pins and positioned to engage in the annular opening in said female coupler member when said male coupler member is inserted in said female coupler member with said opposing drive pins at the innermost ends of said linear slots, said spring-biased locking pin being adapted to be depressed by the cylindrical wall of said female coupler member as the male coupler member is inserted therein.

4,887,930

MANUALLY CONTROLLED ADJUSTABLE LOCKING MECHANISM FOR A CABLE CONTROL SYSTEM

Adam W. Chaczyk, Allen Park, Mich., and Kelvin T. Brown, Toledo, Ohio, assignors to Babcock Industries Inc., Fairfield, Conn.

Filed Nov. 18, 1988, Ser. No. 273,259
Int. Cl.[4] F16B 7/10
U.S. Cl. 403—379 **11 Claims**



1. A manually controlled adjustable locking mechanism for a cable control system comprising

a housing having a rectangular opening extending therethrough,

a telescoping member having a rectangular cross section extending into and guided by the opening of said housing,

said telescoping member having a first set of opposed internal transversely extending teeth and a second set of opposed external teeth,

said housing having a rectangular opening extending transversely and intersecting said first-mentioned rectangular opening in said housing,

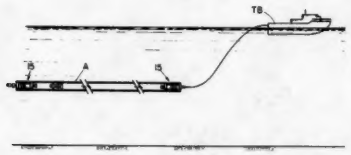
a locking member having a substantially rectangular cross section positioned within the transverse opening and being manually movable between one position and another position,

said locking member having a first set of teeth complementary to the internal teeth of the telescoping member and a second set of internal teeth complementary to the external teeth on the telescoping member in one position of the locking member and adapted to have the teeth disengaged from the telescoping member in said other position.

4,887,931
METHOD AND APPARATUS FOR TOWING SUBSEA PIPELINE SECTIONS

Raymond A. Frisby, Houston, Tex., and George E. Conover, Carencro, La., assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Feb. 16, 1989, Ser. No. 313,994
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—171 **7 Claims**



1. Apparatus for towing a fluid-containing tubular conduit above a sea bed floor and within a body of water, comprising:

(1) first and second inflatable sealing means placed within the interior of said conduit at respective first and second locations therein, each of said sealing menas being selectively movable from a first unexpanded position to a second expanded position whereby a sealed interior section of said conduit is defined when said sealing means are in the expanded position;

(2) pig means movable within said section between said first and second sealing means and activatable to displace fluid within said section and out of the interior of said conduit when said first and second sealing means are in said second position;

(3) valve means communicably positioned relative to the interior of said section and movable between open and closed positions for selective discharge of said fluid out of said section during movement of said pig means therethrough;

(4) securing means on one of said sealing means for affixation of a tow; and

(5) means for selective injection of a gaseous body into said section to urge said pig means into displacement motion,

whereby buoyancy may be provided through said section sufficient to raise and move said conduit above said sea bed floor while maintaining all of said conduit submerged within said body of water.

4,887,932
INTEGRAL BUOYANCY AND BALLAST SYSTEM FOR SCUBA DIVERS

Douglas J. Toth, Huntington Beach, Calif., assignor to Under Sea Industries, Inc., Rancho Dominguez, Calif.

Filed Dec. 7, 1987, Ser. No. 129,212
Int. Cl.[4] B63C *11/30*
U.S. Cl. 405—186 **8 Claims**

1. An integral buoyancy and ballast apparatus primarily for use by scuba divers and comprising:

a buoyancy compensating device having means for retaining air therein to give buoyancy to a diver;

a backpack having means for securing an air supply tank thereto;

said buoyancy compensating device having means for securing at least one weight thereto to give ballast to a diver;

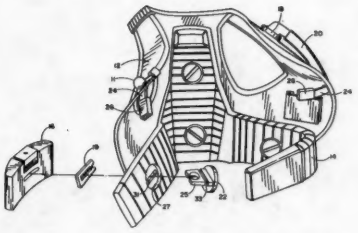
said buoyancy compensating device and said backpack being interconnected to each other to form an integral system;

at least one weight assembly having a weight releasably connected to said buoyancy compensating device and having means for effecting release thereof with only one hand;

said means for effecting release comprising a spring biased actuator on said weight and a retainer on said buoyancy compensating device, said retainer being retained in said weight when said actuator is in a first position and being removable from said weight when said actuator is in a second position;

said retainer being affixed to said buoyancy compensating device and comprising an insert member extending radially from said buoyancy compensating device; and

wherein said weight further comprises a slot shaped to receive said insert member in intimate contact therewith;

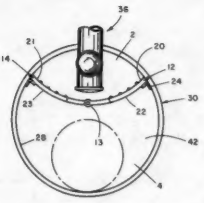


said insert member comprising a C-shaped ring and said actuator comprising a ring retainer having an elongated shaft connected for slideable motion between said first and second positions of said actuator, said weight having a passage for receiving said ring retainer.

4,887,933
DRAIN PIPE SHIELD

Warren Schaier, 40 Meadowbrook Dr., Wrentham, Mass. 02093

Continuation of Ser. No. 205,677, Jun. 13, 1988, abandoned.
This application Jun. 5, 1989, Ser. No. 363,385
Int. Cl.[4] E02D *29/12*
U.S. Cl. 405—36 **8 Claims**



1. The combination of a drain pipe shield, a catch basin and an outlet pipe, the catch basin having an inner wall, the drain pipe shield comprising:

(a) a first and a second section; the first section including a first side edge and a second side edge; the second section including a third side edge and a fourth side edge, the second side edge and the third side edges adapted to be hingedly connected together;

(b) a plurality of attachment means being affixed to the first side edge and the fourth side edge of the shield, and each of the attachment means being connected to the inner wall, the first and second sections hingedly attached to the inner wall by the attachment means;

(c) the first and second sections being impermeable;

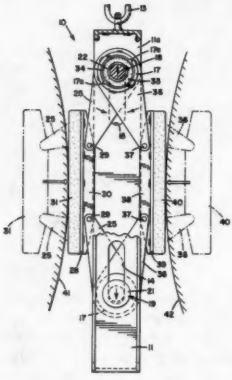
(d) the outlet pipe opening into the catch basin through the inner wall and being in spaced relation to the drain pipe shield whereby the drain pipe shield protects the outlet pipe.

4,887,934

IMPACT ABSORBING DEVICE

James H. Kramer, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 31, 1988, Ser. No. 264,669
Int. Cl.[4] E02B *3/22;* B63B *59/02;* F16F *1/14, 1/36*
U.S. Cl. 405—213 10 Claims



1. A floating impact absorbing device for use in docking two adjacent vessels comprising a pair of spaced support means, a pair of torsion spring means mounted on said support means, each of said torsion spring means having oppositely extending lever means, impact pad means located on opposite sides of said support means and connected to adjacent lever means to provide a reactive movement upon contacting the sides of vessels, said lever means pivotally connected to said torsion spring means to store energy therein on pivotal movement of said lever means toward each other as said pads move toward each other, each of said support means has a pair of slots in longitudinal alignment, said longitudinally aligned slots being aligned laterally in pairs to define two pairs of laterally aligned slots, and said pair of torsion spring means guided in said pairs of slots as said lever means move toward each other.

4,887,935

METHOD OF CONTROLLING THE MOVEMENT OF A LONGWALL EXCAVATION FRONT, ESPECIALLY THE FACE OR BREAST OF A COAL SEAM

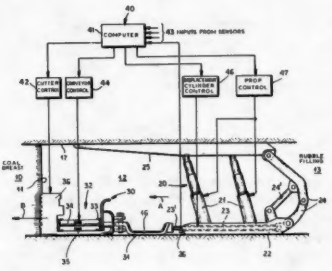
Manfred Koppers, Duisburg; Lotar Sebastian, Bochum, and Kuno Guse, Witten-Bommern, all of Fed. Rep. of Germany, assignors to Bochumer Eisenhutte Heintzmann GmbH & Co. KG, Bochum, Fed. Rep. of Germany

Filed Dec. 21, 1988, Ser. No. 288,408
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743758
Int. Cl.[4] E21C *35/08;* E21D *23/00, 15/44*
U.S. Cl. 405—302 14 Claims

1. A method of controlling the advance of an mining front in longwall mining wherein a support is subdivided to form a row of props with respective fluid-operated prop rams and with respective excavator assemblies disposed along said mining front, each assembly comprises a conveyor element linked to the other elements of the chain to form a continuous conveyor displacing mined material along said front and a cutter element is provided to mine said material from a seam into said conveyor, each conveyor element being connected to the respective prop by a respective fluid-operated displacement cylinder, the displacement cylinders and at least the rams of the props are controlled by a central control computer, and sensors are provided to detect movements of said props and conveyor elements and are connected to said computer, said method comprising the steps of:

(a) automatically determining at said computer, during mining of said material from said seam and displacement thereof along said conveyor, cyclically an actual location and contour of a conveyor line (F_1, F_2, F_3) of at least some of said conveyor elements corresponding to actual positions thereof;

(b) automatically determining at said computer an actual



location and contour of a prop line (A_1, A_2) of at least some of said props corresponding to actual positions thereof;

(c) establishing a baseline at said computer utilizing said conveyor line and said prop line; and

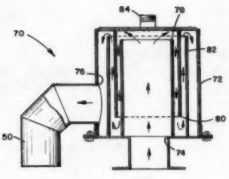
(d) automatically advancing at least some of said conveyor elements and drawing at least some of said props after said conveyor elements under the control of said computer using said baseline as a reference for the advance of said conveyor elements and the drawing of said props.

4,887,936

CYCLONE SEPARATOR WITH ACCELERATOR PLATE FOR PNEUMATIC CONVEYOR

Roy O. Christianson, and Frank W. Christianson, both of Blomkest, Minn., assignors to Christianson Systems, Inc., Blomkest, Minn.

Filed Aug. 12, 1987, Ser. No. 85,394
Int. Cl.[4] B65G *53/60, 53/40;* B60P *1/60*
U.S. Cl. 406—171 13 Claims



1. A cyclone separator for use with a pneumatic grain conveyor, which comprises:

a housing having a top end wall, a generally cylindrical upper side wall, and a generally conical truncated lower side wall;

means defining a tangential material inlet in the upper side wall of said housing;

means defining an axial material outlet in the lower side wall of said housing;

a generally cylindrical subhousing extending axially into the top end wall of said housing, said subhousing having a closed external top end and an open internal bottom end terminating between the material inlet and material outlet;

a generally cylindrical screen disposed within the top end of

said subhousing and extending partially into the bottom end thereof, said screen being of relatively smaller diameter than said subhousing in order to define a predetermined annulus therebetween;

a first transverse baffle plate mounted inside said screen, said first baffle plate defining a predetermined open annulus with said screen;

means defining a radial air outlet adjacent said screen in the top end of said subhousing;

means positioned between the air outlet and the bottom end of said subhousing for blocking the annulus between said screen and subhousing.

4,887,937

LOAD CARRYING FLOOR

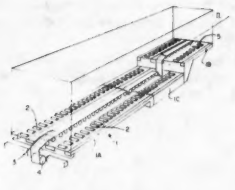
Kees W. Thunnissen, Boslaan, Netherlands, assignor to Talson Transport Engineering B.V., Heeze, Netherlands

Filed Feb. 23, 1988, Ser. No. 159,189

Claims priority, application Netherlands, Feb. 24, 1987, 8700453

Int. Cl.[4] B60P *1/38*

U.S. Cl. 414—527 **5 Claims**



1. A load carrying floor of a load transporting vehicle, comprising at least two sections both provided with a number of roller tracks disposed parallel to one another for receiving a load which may be displaced across the floor with low frictional resistance, the rollers of said tracks being vertically adjustably mounted between an inactive position, in which said rollers are fully retracted below an upper floor surface, and an active position, in which said rollers partially upwardly project from the upper floor surface, displacement and holding means including at least one additional track of rollers, over which a friction belt is trained, which is adapted to come into frictional contact with a lower side of a load and to be selectively driven in two opposite directions so as to selectively displace the load in either of two directions and parallel to the roller tracks, said belt having ends which are fastened for winding or unwinding, respectively, on two drums each provided at a respective end of the floor, said additional track of rollers being movably supported in a frame and provided with means for lowering and lifting said rollers of said additional track along with said friction belt thereon between a first position below said upper floor surface and a second position above said upper floor surface.

4,887,938

CONTROLLABLE LOCKING APPARATUS FOR IMPLEMENT CARRYING WORK VEHICLE

Jeffery W. Menke, Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Aug. 1, 1988, Ser. No. 227,205

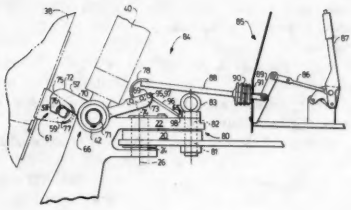
Int. Cl.[4] B66F *9/00*; E02F *3/32*

U.S. Cl. 414—694 **7 Claims**

1. A controllable locking apparatus for a work vehicle having a support, an implement carrying swing frame connected to said support by a first pivot pin apparatus, and an elevatable boom connected to said swing frame by a second pivot pin apparatus, comprising:

a boom lock for locking said boom in a substantially vertical position and maintaining said boom against movement, said boom lock having a first locking member affixed to said swing frame and a second locking member affixed to said boom, said locking members being controllably moveable between a first position at which the boom is in a substantially vertical position and the locking members are engaged and maintaining said boom against movement and a second position at which said locking members are disengaged and said boom is free for movement;

a swing lock for locking said swing frame against side to side movement, said swing lock having a pin, an opening in said swing frame and an opening in said support, said openings being aligned with one another at a preselected



location of said swing frame and said pin being insertable into said openings and maintaining said swing frame against movement; and

a means for obstructing insertion of said pin in said openings at said second position of said locking members, said obstruction means being moveable in response to the movement of said first locking member between a first position at which said obstruction means is spaced from said openings at said first position of said locking members allowing insertion of said pin into said openings and a second position at which said obstruction means is covering said openings and obstructing insertion of said pin in said openings at the said position of said locking members.

4,887,939

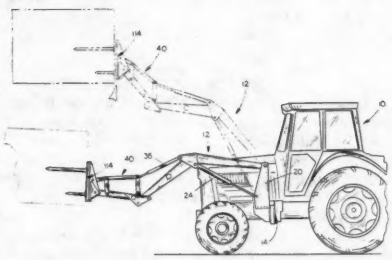
EXTENSION ARM ASSEMBLY FOR A TRACTOR LOADER

Joseph W. Langenfeld, and Neal W. Westendorf, both of Onawa, Iowa, assignors to Westendorf Mfg. Co., Inc., Onawa, Iowa

Filed Oct. 31, 1988, Ser. No. 264,839

Int. Cl.[4] B66C *23/00*

U.S. Cl. 414—722 **1 Claim**



1. In combination,

a tractor,

a front loader mounted on said tractor,

said loader including a loader frame means, first and second boom arms pivotally mounted on said loader frame means

and extending forwardly of said tractor, and means for pivotally raising and lowering said boom arms relative to said loader frame means and said tractor,

first and second elongated extension arms removably secured to the forward ends of said first and second boom arms respectively and extending forwardly therefrom, said extension arms having rearward and forward ends and upper and lower sides,

a first upstanding post means pivotally secured at its lower end to the upper side of said first extension arm and extending upwardly therefrom adjacent the rearward end thereof and pivotable forwardly to a position parallel and adjacent said first extension arm and pivotable rearwardly to a position parallel and adjacent said first boom arm,

a second upstanding post means pivotally secured at its lower end to said first extension arm and extending upwardly therefrom forwardly of said first upstanding post means,

a first elongated linkage member pivotally secured at one end to the upper end of first upstanding post means and pivotally secured at its other end to the upper end of said second upstanding post means,

a third upstanding post means pivotally secured at its lower end to the upper side of said second extension arm and extending upwardly therefrom adjacent the rearward end thereof and pivotable forwardly to a position parallel and adjacent said second extension arm and pivotable rearwardly to a position parallel and adjacent said second boom arm,

a fourth upstanding post means pivotally secured at its lower end to said second extension arm and extending upwardly therefrom forwardly of said third upstanding post means,

a second elongated linkage member pivotally secured at one end to the upper end of said third upstanding post means and pivotally secured at its other end to the upper end of said fourth upstanding post means,

a third elongated linkage member pivotally secured at one end to said second upstanding post means and extending forwardly therefrom,

a fourth elongated linkage member pivotally secured at one end to said fourth upstanding post means and extending forwardly therefrom,

and a materials handling attachment operatively pivotally secured to the forward ends of said first and second extension arms and the forward ends of said third and fourth linkage members,

a first hydraulic cylinder operatively pivotally connected at one end to said first boom arm and operatively pivotally secured at its other end to said first upstanding post means,

and a second hydraulic cylinder operatively pivotally secured at one end to said second boom arm and operatively pivotally connected at its other end to said third upstanding post means.

4,887,940

MULTISTAGE FLUID MACHINE

Yasumasa Todoroki; Haruo Miura, both of Ibaraki, and Shigenobu Ohashi, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

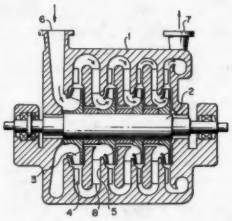
Filed Jul. 21, 1988, Ser. No. 222,429

Claims priority, application Japan, Jul. 23, 1987, 62-184271

Int. Cl.[4] F02D *29/20*

U.S. Cl. 415—199.1 **2 Claims**

1. A multistage fluid machine including a casing, a rotary shaft, and a plurality of impellers each having the same number of blades and mounted on said rotary shaft in a multistage arrangement, said impellers are fixed to said rotary shaft in such a manner that when said impellers are projected on a plane normal to said rotary shaft, all of the blades of said impellers are shifted out of phase with respect to each other in a circumferential direction on said plane without overlapping each other so that the amount of shift between the adjacent blades becomes maximum, and wherein the blades of any one impeller and those of adjacent impellers are shifted out of



phase with respect to each other in a circumferential direction by an angle which is one half of a blade pitch of each impeller.

4,887,941

METHOD AND APPARATUS FOR STARTING SERIES-COUPLED VACUUM PUMPS

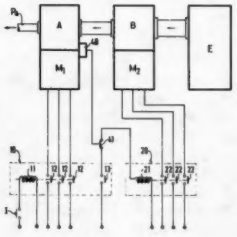
Jean-Marie Crinquette, Annecy Le Vieux, and Jacques Long, Annecy, both of France, assignors to Societe anonyme dite: Alcatel Cit, Paris, France

Filed Sep. 26, 1988, Ser. No. 249,154

Claims priority, application France, Sep. 25, 1987, 87 13267

Int. Cl.[4] F04B *37/14, 23/08*

U.S. Cl. 417—2 **5 Claims**



1. Starting apparatus for starting series-coupled vacuum pumps comprising a primary pump and at least one secondary pump connected between the primary pump and an enclosure in which a vacuum is to be established, said primary pump and said secondary pump each having an electric motor for operating the same, a three phase source of electrical power for said electrical motors, a first electromagnetic relay having a coil controlled by a manual switch and having three contactors for connecting the three phases of said electrical power source to the motor of the primary pump and a second electromagnetic relay for switching said electrical power source to the electric motor of said secondary pump, the improvement wherein, a secondary electromagnetic relay connects said electrical power source to said electric motor of said secondary pump, said secondary relay having a coil powered via a fourth contactor of said first relay, said fourth contactor having a make time delay, and via a contactor of a detector measuring a physical operating parameter of said primary pump which varies as a function of primary pump suction pressure whereby, a pumping operation is initiated by energization of said first electromagnetic relay by closure of the three contactors of said first electromagnetic relay, said second electromagnetic relay is not initially energized due to the time delay in closure of said fourth contactor and the electric motor of said secondary pump remains deenergized, and wherein normally, due to the time delay of the fourth contactor, the physical

operating parameter of the primary pump reduces in magnitude such that the contactor of the detector closes after expiration of the time delay of said fourth contactor thereby energizing the coil of said secondary relay to connect said electric motor of said secondary pump across said electrical power source, whereby said apparatus eliminates the need for a pressure gage connected to the suction of the primary pump which must withstand corrosion and dust laden gases, which pressure gage is also sensitive to vibration and lacks reliability leading to failure of the secondary pump to start or causing said secondary pump to start at too high a pressure with consequent risks of pump seizing .

4,887,942

PRESSURE EXCHANGER FOR LIQUIDS

Leif J. Hauge, Ostre Hallsetvangen 3a, N-7027 Trondheim, Norway

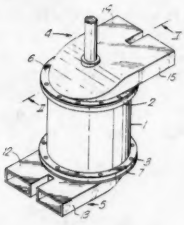
PCT No. PCT/NO87/00086, § 371 Date Sep. 2, 1988, § 102(e) Date Sep. 2, 1988, PCT Pub. No. WO88/05133, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 30, 1987, Ser. No. 246,658

Claims priority, application Norway, Jan. 5, 1987, 870016

Int. Cl.[4] F04F *11/00*

U.S. Cl. 417—64 **7 Claims**



1. Pressure exchanger for transfer of pressure energy from a liquid flow of one liquid system to a liquid flow of another liquid system, comprising a housing (1) with an inlet- and an outlet duct (12, 13 resp. 14, 15) for each liquid flow, and a cylindrical rotor (8) arranged in the housing (1) and adapted to rotation about its longitudinal axis, and provided with a number of passages or bores (9) extending parallel to the longitudinal axis and having an opening at each end, the inlet- and outlet ducts of the liquid systems forming pairs of ducts provided on respective sides of the rotor (8), and the bores of the rotor (8) being adapted to such connection with the inlet- and outlet ducts of the housing that they alternately carry liquid under high pressure and liquid under low pressure of the respective systems during rotation of the rotor, characterized in that the inner openings of the ducts, i.e. the openings being close to the rotor, are formed approximately as a segment of a circle with a central angle of 180°, and that a partition wall is formed between these openings of each pair of ducts.

4,887,943

GAS COMPRESSOR OF VARIABLE VOLUME

Takeshi Kobayashi, and Junichi Asai, both of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Chiba, Japan

Filed Aug. 29, 1986, Ser. No. 902,421

Claims priority, application Japan, Aug. 30, 1985, 60-191477

Int. Cl.[4] F04B *49/02;* **F04C** *29/08*

U.S. Cl. 417—295 **20 Claims**

1. A gas compressor of variable volume comprising: a hollow cylindrical body having a substantially elliptic inner peripheral surface; a front side block having a communicating hole and fixed to one side of the cylindrical body; a rear side block fixed to the other side of the cylindrical body; an intake chamber for receiving therein a fluid and for feeding the fluid to a cylinder chamber defined by the cylindrical body and the front and rear side blocks through the communicating hole; a rotor rotatably mounted in the cylinder chamber and carrying a plurality of vanes mounted to slidably protrude and retract radially from and into the rotor to define in the cylinder chamber a compression chamber in which the fluid is compressed; a rotary plate formed with a recess in a peripheral portion thereof and mounted to undergo angular displacement within a predetermined angular range on the inner face of the front side block so as to regulate the flow of the fluid from the intake chamber to the cylinder chamber through the communicating hole; a piston for angularly displacing the rotary plate within the predetermined angular range, one end of the piston being exposed to the intake chamber to be driven in direct response to the intake pressure of the fluid in the intake chamber to angularly displace the rotary plate to thereby vary the position of the recess so that the capacity of the compression chamber can be controlled in accordance with the running state of the gas compressor; and counterbalancing means for counterbalancing the piston relative to the intake pressure applied to said one end of the piston.

4,887,944

FUEL INJECTION PUMP INCLUDING PLUNGER SETTING DEVICE

Donald Worby, Stonehouse, and Gerald S. Thomas, Longlevens, both of United Kingdom, assignors to Lucas Industries Public Limited Company, United Kingdom

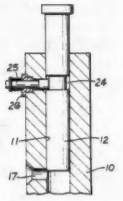
Filed Jan. 19, 1981, Ser. No. 226,515

Claims priority, application United Kingdom, Jan. 29, 1980, 8003017

The portion of the term of this patent subsequent to Mar. 19, 2004, has been disclaimed.

Int. Cl.[4] F02M *59/44*

U.S. Cl. 417—490 **1 Claim**

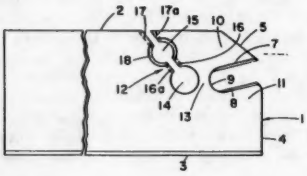


1. A fuel injection pump for supplying fuel to internal combustion engines comprising a pump body from which extends a pump plunger, resilient means acting to urge the plunger outwardly, a thrust assembly mounted at the outer end of the plunger, a recess on the plunger, and a resiliently loaded pin mounted in a housing carried by the pump body for engagement upon depression of the pin, within said recess to set the plunger at a known position relative to the body, said pin being retained against angular movement in its housing, the end portion of the pin being eccentrically disposed, and the housing of the pin and the pump body being cemented together.

4,887,945
METAL CUTTING TOOL WITH RESILIENT INSERT CLAMP

Joseph Pano, Shave Zion, Israel, assignor to ISCAR Ltd., Nahariya, Israel

Continuation-in-part of Ser. No. 94,691, Sep. 9, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 300,069
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1986, 3630752; Oct. 16, 1986, 3635193
Int. Cl.[4] B23B *29/04, 29/14*
U.S. Cl. 407—110 **6 Claims**



1. For use in a metal cutting tool, a cutting insert clamping arrangement comprising:

a holder blade having a pair of elongated, longitudinally directed edges and a transversely directed leading edge;

a pair of clamping jaws formed integrally with the holder blade and being formed with a pair of spaced apart, substantially parallel, clamping surfaces defining between them an insert receiving pocket having a leading end thereof opening into said leading edge;

a holder blade portion located rearwardly of said pocket and having formed therein an elongated slot extending from one of said longitudinally directed edges to an inner end thereof located adjacent to and spaced from a rear closed end of said pocket and directed away from said leading edge;

an intermediate widened portion of said elongated slot adapted to receive a tightening screw;

a bridge portion of said holder blade serving to bridge the inner end of said elongated slot and the rear end of said pocket and about which one of said jaws may be pivotally and resiliently displaced with respect to the other jaw;

a clamping element adpated to bear against the holder blade around the widened portion thereof and having at least one tapered tooth projecting therefrom into the elongated slot adjacent the widened portion; and

coupling means for coupling said clamping element to said tightening screw whereby said clamping element can be forced against the holder blade and the tapered tooth forced into said slot so as to effect said pivotal displacement of said one jaw, thereby effectively clamping a said cutting insert in said pocket.

4,887,946
LOAD ENCLOSING CHAIN RELEASE

Jeff R. Sevier, R.D. #3, Richards Rd., Cazenovia, N.Y. 13035

Filed Oct. 11, 1988, Ser. No. 255,956
Int. Cl.[4] B60P *7/10*
U.S. Cl. 410—32 **7 Claims**

1. A load enclosing chain release apparatus for use in combination with a platform wagon comprising,

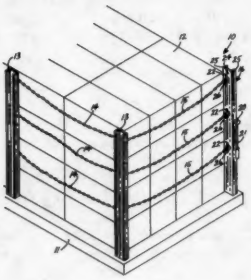
a plurality of support posts integrally secured about a perimeter of said wagon, and

a gate post integrally secured to said wagon wherein said gate post is spaced from at least one of said support posts to provide an opening therebetween, and

at least one elongate chain member including a series of links said elongate chain member being integrally secured to one of said support posts and removably securable to hooks slidably associated with said gate post at the other end of said elongate chain, and

latch means slidably mounted within said gate post for removably disassociating said elongate chain member from said gate post, and

wherein a terminal link of said elongate chain member is releasably securable to said hooks, and

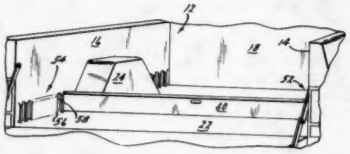


wherein said hooks are integrally secured to said latch means and said latch means is reciprocatably slidable relative to said gate post, wherein said latch means includes a plate member slidably mounted in said gate post and said post is of a "U" shaped cross-sectional configuration, and said plate member is of a width substantially equal to the spacing between legs of said "U" shaped configuration and slidably mounted relative to an interior face of a connecting web connecting said legs.

4,887,947
CARGO RESTRAINT SYSTEM FOR PICK-UP TRUCK BEDLINERS

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Continuation of Ser. No. 27,835, Mar. 19, 1987, abandoned. This application Sep. 22, 1988, Ser. No. 249,234
Int. Cl.[4] B60P *1/64*
U.S. Cl. 410—144 **2 Claims**



1. A cargo restraint system adapted to be mounted in a bed of an automotive vehicle having a horizontally extending support surface and a pair of side walls extending vertically from said support surface, said system comprising: a pair of side surfaces, each surface of said pair fixedly attachable to one side wall of said bed, said side surfaces extending a height from said horizontal support surface along said respective side walls substantially less than the height of the side walls of said bed; a plurality of pairs of recessed elements with one of each pair disposed on each of the side surfaces in opposition to the other; said pairs of recessed elements defining a series of discrete fixed placement locations, said recesses form inwardly open channels opened upwardly at the top of the channels and downwardly to the horizontal support surface; and at least one cargo restraining member adapted to extend between and to be detachably nestingly engaged with opposing ones of said re-

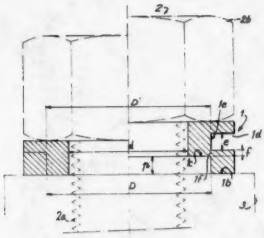
cessed elements to restrain a load such that said cargo restraining member will be positioned transverse to said side walls of said bed between said opposing recessed elements across said horizontal support surface.

4,887,948

DEFORMABLE WASHER, PARTICULARLY FOR PREDETERMINING THE MINIMUM FORCE NEEDED FOR TIGHTENING A NUT OR A SCREW

Lionel Calmettes, Romorantin, France, assignor to Etablissements Caillau, Issy-Les-Moulineaux, France

Filed Oct. 17, 1988, Ser. No. 258,657
Claims priority, application France, Nov. 3, 1987, 87 15235
Int. Cl.[4] F16B *31/00, 31/12*
U.S. Cl. 411—5 **3 Claims**



1. A deformable washer, particularly for ensuring that a minimal force has been exerted on workpieces to be tightened by a nut mounted on a screw, or by a screw cooperating with a tapped hole, said washer being constituted by a solid piece of small thickness with respect to the dimensions of its periphery, and being provided with a central hole substantially corresponding to the diameter of the screw on which it is meant to be mounted, wherein said washer is provided on one of its faces preferably on the face intended to rest against one of the workpieces to be tightened, with a counterbore concentric to the central hole and a bearing surface surrounding said counterbore, said counterbore having a diameter notably greater than the diameter of the central hole and a depth preferably near to the width of said bearing surface, and said washer having on its edge a visible groove of which the cylindrical base is also concentric to the central hole and has a diameter at the most equal to the diameter of the counterbore and preferably just under said counterbore diameter, the thickness of said groove being as near as possible to the depth of said counterbore.

4,887,949

BOLT RETENTION APPARATUS

John H. Dimmick, III, Palm Beach County, and Stephen W. Jorgensen, West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 175,087, Mar. 30, 1988, abandoned. This application Mar. 2, 1989, Ser. No. 318,503
Int. Cl.[4] F16B *39/10*
U.S. Cl. 411—121 **10 Claims**

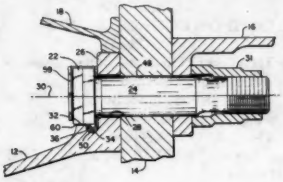
1. An apparatus for retaining a single bolt in a bolt hole during blind assembly comprising:

a flange having a bolt receiving opening, said opening having an axis;

a surface parallel to said axis and spaced from said opening, said surface having a recess therein facing toward said opening and including a shoulder facing toward said flange;

a bolt located within said opening, having a shank and a head;

a retention clip including a base, said base located between said flange and the head of said bolt and at least partially surrounding the side of said shank facing said recess, and including an extension extending into said recess, a portion of said extension abutting an edge of the head of said bolt when said bolt is in said opening; and



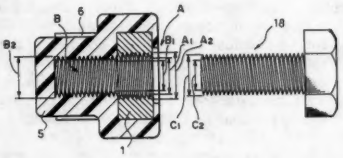
said retention clip also having resilient bolt head engaging arms secured to said base and engaging the face of said head for axially retaining said bolt.

4,887,950

WATERPROOF NUT

Kiyoshi Sakayori, Kodaira; Shinichi Iwasaki, Musashino; Yozo Ishida, Higashimurayama; Toshikazu Shinogaya, Kodaira, and Yuzo Ishizuka, Shiki, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 117,445, Nov. 3, 1987, abandoned, which is a continuation-in-part of Ser. No. 830,867, Feb. 19, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,492
Claims priority, application Japan, Feb. 22, 1985, 60-34176; Jul. 5, 1985, 60-148052; Sep. 17, 1985, 60-204938
Int. Cl.[4] F16B *39/34, 37/14*
U.S. Cl. 411—302 **15 Claims**



1. A waterproof nut which is to be screwed onto a bolt having an external thread, comprising:

(a) a metal nut body having an internal nut thread formed on the inner periphery thereof;

(b) an outer layer which covers the outer periphery of said nut body, said outer layer being made of synthetic resin;

(c) a front surface covering layer integrally connected with said outer layer and partially covering the front surface of said nut body, the thickness of said front surface covering layer being at least 1 mm;

(d) a cap-shaped portion integrally connected with said outer layer and disposed over the rear surface of said nut body so as to cover the free end of the bolt which is screwed into said nut body in such a manner that said free end projects from the rear surface of said nut body, said cap-shaped portion being provided with a constant diameter internal cap thread which is contiguous with the internal nut thread of said nut body;

(e) a non-circular portion formed on the outer periphery of said cap-shaped portion for engagement with a tool to screw said nut onto said bolt; and

(f) a thread overlap percentage by which the external thread of the bolt radially engages the internal cap thread of the cap-shaped portion being greater than a thread overlap percentage by which the external thread of the bolt radially engages the internal nut thread of the nut body for the

length of the cap-shaped portion to insure that the cap-shaped portion withstands a rotational force applied to said non-circular portion to screw said nut onto said bolt.

4,887,951

DUAL COMPOSITE HEADED SELF-THREADING SCREW

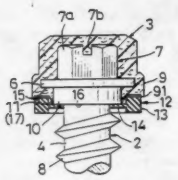
Kenzaburo Hashimoto, Hirakata, Japan, assignor to Maruemu Seisakusho Co., Ltd., Osaka, Japan

Filed Dec. 5, 1988, Ser. No. 279,726

Claims priority, application Japan, Dec. 16, 1987, 62-191595[U]; Dec. 28, 1987, 62-199591[U]

Int. Cl.[4] F16B *19/00, 33/00, 43/00*

U.S. Cl. 411—371 7 Claims



1. Dual composite headed self-threading screw comprising:

a screw main body of metal material having a small head portion thereof in the proximal end of a shank thereof which has threads formed thereon, and a head of synthetic resin material fitted onto the small head portion of said screw main body;

said synthetic resin head being formed of tenacious synthetic resin reinforced by short fiber material, having hexagonal socket wrench engaging sides shaped on the circumferential periphery thereof, and including a substantially annular seat extending from the circumferential periphery thereof, said annular seat having a seal face at the bottom thereof;

said metal screw main body including a cylindrical neck portion formed integrally therewith in the proximal end of the shank portion, said neck portion having a smaller diameter than that of the annular seat of the synthetic resin head, extending downwardly of the seat, and providing a bottom face of said neck portion with a stopper face being exposed from the seat and situated lower than said seal face, so that a substantially annular packing can be placed just beneath the seal face as the stopper face is situated between the seal face and a bottom surface of the packing;

and said small head portion having socket wrench engaging sides formed on the circumferential periphery thereof, said socket wrench engaging sides of said small head portion forming a hexagon smaller in size than the socket wrench engaging sides of the synthetic resin head, so that a corresponding smaller socket wrench can engage with said socket wrench engaging sides of the small head portion when the synthetic resin head is cut upon.

4,887,952

NAIL PLATE

Johann Wolf, Scharnstein, Austria, assignor to Johann Wolf GmbH Kg, Austria

Filed Feb. 5, 1988, Ser. No. 152,478

Claims priority, application European Pat. Off., Feb. 5, 1987, 87101537.6

Int. Cl.[4] F16B *15/00*

U.S. Cl. 411—466 4 Claims

1. A nail plate, comprising

a sheet metal plate having a pair of longitudinal edges parallel to each other, and front and rear edges aligned effectively parallel to each other and diagonally to said longitudinal edges, said sheet metal plate having the form of a rhombus with edges constituted by said longitudinal edges and said front and rear edges,

each of said diagonal front and rear edges comprising a plurality of steps, each said step comprising a respective first edge extending effectively transversely to said longitudinal edges and a respective second edge extending effectively in parallel to said longitudinal edges, and

plural columns of nails formed by tongue-shaped punch-outs in said metal plate, each said column of punch-outs and each said punch-out in each said column being arranged parallel to said longitudinal edges, with all of said punch-outs in each said column being aligned in a respective direction for that column, said punch-outs in adjacent ones of said columns being aligned in opposite directions, and each said punch-out aligned in either one of said opposite directions being located at the same respective position along its column as a respective punch-out in

each other column having the punch-outs arranged in the same direction,

wherein each said nail has a respective base end that is connected to a respective base portion of said nail plate at one end of the respective punch-out, and the length of said punch-outs and the positions of the oppositely-aligned punch-outs between each closest pair of columns in which the punch-outs are aligned in the same direction are such that the sheet metal of the plate extends uninterruptedly between said base portions of said respective punch-outs aligned in the same direction but in different columns and at the same respective positions along said columns, and

wherein the uninterrupted extension of the sheet metal of the nail plate extends in the direction transverse to said longitudinal edges and said columns, between each respective pair of said base portions of said punch-outs at said same respective positions in said adjacent rows having their punch-outs aligned in the same one direction.

4,887,953

STORAGE INSTALLATION

Bruno A. Greub, Uerikon, Switzerland, assignor to System Schultheis AG, Rapperswil, Switzerland

Filed Apr. 1, 1988, Ser. No. 176,619

Claims priority, application Switzerland, Apr. 14, 1987, 1450/87

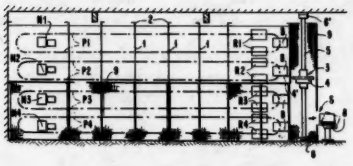
Int. Cl.[4] B65G *1/10*

U.S. Cl. 414—331 4 Claims

1. A storage installation having a plurality of superimposed decks of endless circulating shelf units, each endless circulating shelf unit including two run returning stations passing about horizontally extending axes of which one respective run returning station has a run return axis located together with the respective return axes of all other endless circulating shelf units in one common plane; having further a shelf serving apparatus located adjacent said common plane and movable horizontally in a loading and unloading plane extending parallel thereto and

including vertically movable means for loading and unloading at the run returning station of any respective endless circulating shelf unit from any one of said plurality of decks;

each endless circulating shelf unit comprising an endless circulating conveyor guided along two vertically superimposed runs to move the circulating shelf units vertically



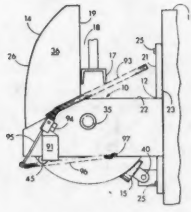
in and out of said loading and unloading plane into a position for loading and unloading the shelf units at an open leading end parallel to said plane by said shelf serving apparatus and having separately operable drive means for each of said horizontal run returning axes at every deck.

4,887,954

VEHICLE RESTRAINT

Glen M. Gregerson, Janesville; John T. Luneuschloss; Henry M. Ebbott, both of Madison, and Raymond A. Beckeman, McFarland, all of Wis., assignors to Air-Lec Industries, Inc., Madison, Wis.

Filed Mar. 9, 1989, Ser. No. 321,185
Int. Cl.[4] B65G *69/00*
U.S. Cl. 414—401 **12 Claims**



1. A vehicle restraint for releasably locking a vehicle to an adjacent structure, comprising:

(a) a frame which can be mounted adjacent to the structure;

(b) a sector assembly which is mounted within the frame to rotate about a substantially horizontal axis in a first rotational direction to a restraint position and in an opposite second rotational direction to a release position, the sector assembly including at least one sector plate which rotates in a substantially vertical plane and which includes a restraint sector, portion with a restraint surface formed by a radial-like sector margin facing in the first rotational direction, which restraint sector portion extends substantially upwardly above the frame when the sector assembly is in its restraint position to define a confining area behind the restraint surface, and allows forward access to the confining area when the sector assembly is in its release position; and a locking sector portion, with a locking surface formed by a radial-like sector margin facing in the second rotational direction;

(c) at least one movable impediment biased to move to intersect said vertical plane, and mounted to the frame such that when the sector assembly is in its restraint position, the impediment can move to intersect the vertical plane adjacent to and slightly in the second rotational direction from the locking surface, thereby preventing rotation of the sector assembly in the second rotational direction to its release position until the impediment is moved away from the vertical plane; and

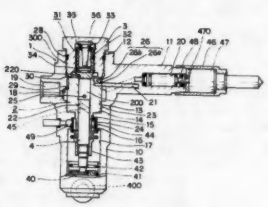
(d) an actuator, which is connected to the frame and sector assembly to rotate the assembly in the first rotational direction into the restraint position.

4,887,955

UNIT INJECTOR

Iwao Maruyama, and Hidetoshi Saitoh, both of Saitama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Division of Ser. No. 59,058, Jun. 8, 1987, abandoned. This application May 17, 1989, Ser. No. 353,408
Claims priority, application Japan, Jun. 24, 1986, 61-146031
Int. Cl.[4] F02M *59/46*
U.S. Cl. 417—501 **4 Claims**



1. In fuel injection means including a housing, an injection pumping mechanism in said housing and having a first axis, and an injection valve mechanism in said housing and having a second axis transverse to said first axis, said injection pumping mechanism including a barrel, a plunger and a control sleeve, said injection valve mechanism including an oil path and a nozzle body, the improvement comprising the following characteristics:

said housing having an axial cavity adapted to enclose said barrel, said axial cavity being shaped to define, in sequence, a plug hole, an insertion hole which is smaller in diameter than said plug hole and which has a circumferential recess and which terminates at a flat step, a small-diameter hole which is smaller in diameter than said insertion hole, and a bottom hole which is larger in diameter than said small-diameter hole;

said barrel including a body part having an axial sliding hole adapted slidably to receive said plunger, said sliding hole terminating in a value seat adapted to fit within said insertion hole so as to form, with said circumferential recess, an oil well and a shaft part adapted to slide within said small-diameter hole, said barrel having been cooled and then inserted into said axial cavity until said body part contacts said flat step and then permitted to expand to form an integral union with said housing;

said plug hole having a plug screwed therein, said plug having a ring shaped edge portion which contacts said barrel so as to form, with said plug hole, an annular space outside said edge portion,

said barrel having a slit in its outer peripheral surface providing a passageway between said annular space and said oil well,

said plug having an O ring adapted sealingly to engage said plug hole and having an air-withdrawing check valve having a valve body positioned on said seat so as to form, with said ring-shaped edge portion, an annular space inside said edge portion.

said barrel having an outlet port with a bent configuration providing communication between said oil path and said annular space within said ring-shaped edge portion.

4,887,956

VARIABLE OUTPUT OIL PUMP

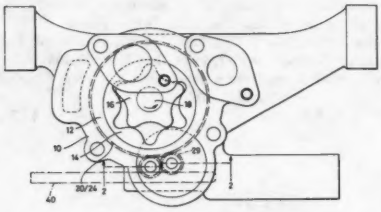
Robin E. Child, Leamington Spa, England, assignor to Concentric Pumps Limited, Great Britain

Filed Mar. 16, 1988, Ser. No. 168,961

Claims priority, application United Kingdom, Mar. 20, 1987, 8706630

Int. Cl.[4] F04C 2/10, 15/04

U.S. Cl. 418—20 2 Claims



1. In a pump of the kind having a body provided with an inlet port and an outlet port, a single male lobed rotor with n lobes which extends through and is meshed with a pair of side by side female lobed annuli of n=x lobes, each annulus being journalled in a separate eccentric ring having an external gear and being journalled in the body of the pump, and means for turning the gears in opposite directions so as to move the annuli between aligned identical positions for maximum pump output and non-aligned mirror image positions for minimum pump output, said movement being relative to the inlet and outlet ports of the pump, the improvement wherein the means for turning said gears comprises a hydraulic system having a piston in a cylinder, a control bore in communication with said cylinder via passageways, and a spool valve located in said control bore for directing pressure fluid to opposite sides of said piston, said spool valve being displaceable in one direction by pressure fluid from said outlet and in the opposite direction by pressure fluid displaced by movement of said piston.

4,887,957

NOZZLE FOR MELT SPINNING OF PITCH AND METHOD FOR SPINNING PITCH

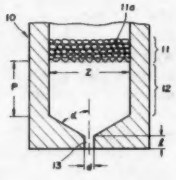
Masakatsu Ohta, and Masaaki Itoi, both of Kimitsu, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,762

Claims priority, application Japan, Oct. 9, 1986, 61-240740; Feb. 25, 1987, 62-042146

Int. Cl.[4] D01D 4/02

U.S. Cl. 425—72.2 15 Claims



1. A nozzle for melt-spinning of pitch to produce pitch fibers, and which produces no substantial spinning unevenness, comprising:

nozzle means for receiving the pitch, and including a pitch flow turning section, a pitch reservoir section having a top surface and in which an angle α between said top surface and a spinning direction is 45° to 100°, and at least two nozzle holes having a nozzle hole index F ($=Z^2/d \cdot l$) of not less than 10 and not more than 5,000 where Z is the inner diameter of the pitch reservoir section, l is the nozzle hole length, and d is the nozzle hole diameter;

said nozzle means being arranged such that the pitch is passed first through said pitch flow turning section, secondly through said pitch reservoir section, and thereafter through said at least two nozzle holes;

said pitch reservoir section defining a storing space between said pitch flow turning section and said at least two nozzle holes; and

a pitch flow disturbing material in said pitch flow turning section and through which said pitch is passable for disturbing a flow of spinning pitch passing therethrough.

4,887,958

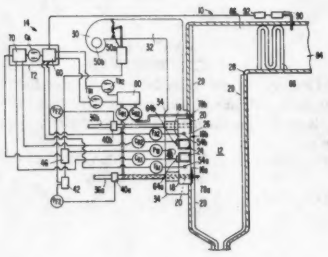
METHOD AND SYSTEM FOR CONTROLLING THE SUPPLY OF FUEL AND AIR TO A FURNACE

Donald K. Hagar, R.D. 2, Box 49-C, Ammaus, Pa. 18048

Filed Oct. 10, 1986, Ser. No. 917,900

Int. Cl.[4] F23N 3/06, 5/24

U.S. Cl. 431—12 29 Claims



1. A control system for a furnace to which fuel and combustion air are fed through a plurality of burner assemblies, the combustion air being fed to the burner assemblies via a fan and air conduit, the fuel being fed to the burner assembly via fuel flow paths, each burner assembly including an air valve for controlling the flow of combustion air through that burner assembly, each burner assembly producing a flame, the control system comprising:

(a) a plurality of fuel flow measuring instruments, each fuel flow measuring instrument being for measuring the fuel flow in one fuel flow path and producing a signal representative of fuel flow in that path;

(b) A fuel flow signal comparator for comparing signals produced by the fuel flow measuring instruments and producing an output signal representative of the fuel flow in the fuel flow path having the greatest fuel flow, the fuel flow measuring instruments being coupled with the fuel flow signal comparator;

(c) a forced air pressure controller coupled with said fuel flow signal comparator, the forced air pressure controller including means for sensing pressure of the forced air being fed to the burner assemblies via the fan and air conduit, and means for regulating the supply of air to the burner assemblies in response to the output signal from the fuel flow signal comparator and in response to the sensed pressure of forced air being fed to the burner assemblies via the fan and air conduit, so that fuel flow in the path having the greatest fuel flow determines the amount of combustion air available to all of the burner assemblies, whereby an adequate supply of combustion air is ensured for the burner assembly requiring the greatest supply of combustion air, which burner assembly is that to which leads the fuel path having the greatest fuel flow;

(d) a set of air flow measuring instruments for the burner

assemblies, which instruments are so arranged as to provide an air flow measuring instrument for each burner assembly, each air flow measuring instrument producing an air flow signal representative of combustion air flow through its individual associated burner assembly;

(e) an air signal processor, said air signal processor being coupled with the air flow measuring instruments to receive flow signals therefrom, and to determine whether such air flow signals meet predetermined conditions and for producing a corrective signal if the air flow signals do not meet the predetermined conditions;

(f) a set of register position determiners for the burner assemblies arranged such that a register position determiner is associated with each burner assembly, each register position determiner being for determining the extent of opening of an individual air valve for an individual burner assembly and for providing a valve position signal representative thereof

(g) A register position comparator coupled with the register position determiners for comparing the relative positions of the air valves in accordance with information received from the register position determiners and producing an output to adjust the relative positions of the air valves so that at least one burner assembly achieves a predetermined condition representing maximum performance;

(h) the air signal processor, register position comparator, and forced air pressure controller all being coupled together, whereby the corrective signal from the air signal processor may result in adjustment of the air valves, or may result in adjustment of the forced air flow to the burner assemblies, or both, until the predetermined conditions are achieved;

(i) a set of flame reading instruments for reading a characteristic of the flames produced in the furnace by the burner assemblies, which flame reading instruments are arranged such that each individual burner assembly has a flame reading instrument associated therewith for individually reading a characteristic of the individual flame produced by that particular burner assembly; and

(j) a flame reading processor, coupled with the flame reading instruments and with the air signal processor for receiving readings from the flame reading instruments, comparing the readings to predetermined values and, if the readings do not conform to predetermined values, to send a trim signal to the air signal processor which, in turn, will modify its corrective signal to produce corrective action so that the predetermined values for flame readings are met.

26. A method for providing fuel and air to a furnace through a plurality of burner assemblies, each burner assembly including an air valve for controlling the flow of combustion air through the burner assembly, the method comprising the steps of:

(a) sensing a condition reflecting individual performance of each separate burner assembly; and

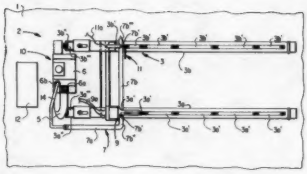
(b) separately controlling each individual air valve in response to the performance reflecting condition sensed in said sensing step to thereby individually control the performance of each burner assembly, said air valve controlling step including controlling each individual air valve at a point in the burner assembly upstream of where the combustion air is directed into an inwardly spiraling pattern in the burner assembly under the influence of an inwardly spiraling scroll passageway section in the burner assembly.

4,887,959

GAS FURNACE WITH IMPROVED IGNITION

Timothy J. Shellenberger, Fort Smith, Ark., assignor to Rheem Manufacturing Company, New York, N.Y.

Filed Nov. 17, 1988, Ser. No. 273,363
Int. Cl.[4] F23Q 9/08
U.S. Cl. 431—46 8 Claims



1. Gas-fired furnace apparatus comprising:

a mutually spaced plurality of main burner means for receiving throughflows of combustible gas ignitable to create heating flames;

carryover tube means, extending adjacent said plurality of main burner means, for receiving a throughflow of combustible gas ignitable to create a main burner means ignition flame operative to ignite combustible gas flowing through said plurality of main burner means;

hot surface igniter means positioned at a first section of said carryover tube means and operative to ignite at said first section combustible gas flowing into said carryover tube means toward a second section thereof positioned downstream from said first section to create said main burner means ignition flame;

flame sensing means, positioned adjacent said second section of said carryover tube means, for sensing the presence of a portion of said main burner means ignition flame at said second section of said carryover tube means and responsively generating an ignition flame confirmation signal;

valve means for receiving combustible gas from a source thereof, said valve means having a selectively openable first outlet communicating with said carryover tube for operatively flowing a first portion of the received combustible gas into said carryover tube means, and a selectively openable second outlet communicating with said plurality of main burner means for operatively flowing a second portion of the received combustible gas into said plurality of main burner means; and

ignition control means for sequentially:

(1) operating said hot surface igniter means and opening said first valve means outlet, in response to a sensed demand for heat from said furnace apparatus,

(2) opening said second valve means outlet, in response to the generation of said ignition flame confirmation signals, to create said heating flames,

(3) maintaining said first and second valve means outlets in their open positions for the remainder of said sensed demand for heat from said furnace apparatus to thereby maintain each of said ignition and heating flames during said remainder of said sensed demand for heat from said furnace apparatus, and

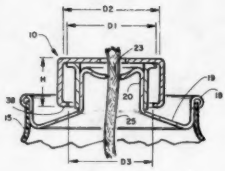
(4) closing each of said first and second valve means outlets, upon cessation of said sensed demand for heat from said furnace apparatus, to thereby extinguish each of said ignition and heating flames.

4,887,960

AUTOMATIC FLAME SNUFFER ASSEMBLY

Jack Stewart, 3050 Rue D' Orleans, San Diego, Calif. 92110, and Jim Lowe, P.O. Box 1888, Alpine, Calif. 92001

Filed Jul. 25, 1988, Ser. No. 223,396
Int. Cl.[4] F23Q *25/00*; F23D *3/18*
U.S. Cl. 431—146 2 Claims



1. The combination of an automatic flame snuffer assembly and a fuel lamp container comprising:

a fuel lamp container having lamp fuel oil therein, said container having a sealing cap in its top end, said sealing cap having a cylindrical neck with a top wall that has a wick aperture therein, an elongated wick having its bottom end immersed in said lamp fuel oil and its top end extending upwardly through said wick aperture a predetermined height;

flame snuffer means for automatically snuffing out the flame on the wick of the fuel lamp container when the lamp is tipped over comprising an automatic flame snuffer assembly having an assembly mounting sleeve and a snuffer member, said assembly mounting sleeve having a cylindrical portion that is detachably friction fit on the cylindrical neck of said sealing cap, a radially outwardly extending flange is formed on the top end of said cylindrical wall portion, the snuffer member loosely fits over said assembly mounting sleeve, said snuffer member having a horizontally oriented disc-shaped top wall that covers the top wall of the cylindrical neck of said sealing cap, said disc-shaped top wall having a central aperture therein, a cylindrical side wall extends downwardly from said top wall, a radial inwardly extending flange is formed on the bottom edge of said cylindrical wall;

the annular flange of said assembly mounting sleeve has a predetermined diameter D1 that is less than the internal diameter D2 of a cylindrical side of a snuffer member so that the snuffer member is allowed to perform a horizontal sliding action when the fuel lamp container is knocked over and the automatic snuffer assembly performs its function; and

the predetermined internal diameter D3 of the inwardly extending flange is less than the predetermined diameter D1 of the assembly mounting sleeve to prevent them from becoming disconnected from each other.

4,887,961

RADIANT WALL BURNER APPARATUS

Kenichi Kuwabara, Yashio, and Makoto Miyata, Tokyo, both of Japan, assignors to Kabushiki Kaisha Kuwabara Seisakusho, Japan

Filed Mar. 14, 1988, Ser. No. 167,983
Claims priority, application Japan, Mar. 26, 1987, 62-72598
Int. Cl.[4] F23C *5/08*
U.S. Cl. 431—177 7 Claims

1. A radiant wall burner which is designed to be mounted on a wall of a radiant-type furnace, comprising:

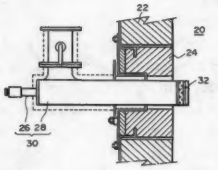
a fuel supply tube defining a fuel supply passage for a fuel which may be a gaseous fuel and provided with a fuel outlet nozzle, said fuel supply tube being provided on its end with a fuel header having an annular groove formed in an outer peripheral surface thereof and a plurality of fuel nozzle ports opening in said annular groove so as to constitute said fuel outlet nozzle;

an air supply tube combined with said fuel supply tube so as to provide a double-tube structure such that one of said fuel supply tube and said air supply tube constitutes an inner tube while the other constitutes an outer tube, said air supply tube defining an air supply passage and having an air outlet which opens towards a core region of said radiant-type furnace; and

a plate disposed so as to oppose said air outlet of said air supply tube thereby to deflect the flow of combustion air from said air outlet in the radial directions.

6. A radiant wall burner apparatus which is designed to be mounted on a wall of a radiant-type furnace, comprising:

a fuel supply tube defining a fuel supply passage for a fuel which may be a gaseous fuel and provided at its end with a fuel header having a plurality of nozzle ports formed in



a wall thereof adjacent to a core region of said furnace so as to constitute a fuel outlet nozzle;

an air supply tube surrounding said fuel supply tube so as to define therebetween an air supply passage for combustion air separate from said fuel supply passage, said air supply tube cooperating with a wall of said fuel header adjacent to said wall of said furnace to define therebetween a primary air outlet nozzle, said air supply tube further having a second air outlet extending through said fuel header and opening in a surface of said fuel header adjacent to the core region of said furnace; and

a plate disposed near the surface of said fuel header adjacent to said core region of said furnace leaving a predetermined gap therebetween so as to define an outlet nozzle through which the combustion air introduced through said second air outlet and said fuel from said fuel outlet nozzle are deflected radially outwardly so as to enable them to flow along the surface of said wall of said furnace.

4,887,962

PARTIAL COMBUSTION BURNER WITH SPIRAL-FLOW COOLED FACE

Hendricus J. A. Hasenack, Amsterdam, and Ian Poll, The Hague, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

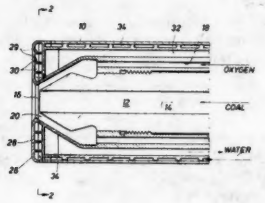
Filed Feb. 17, 1988, Ser. No. 156,675
The portion of the term of this patent subsequent to Sep. 12, 2004, has been disclaimed.
Int. Cl.[4] F23D *1/00*; C10J *3/50*
U.S. Cl. 110—263 3 Claims

1. A burner for the partial combustion of finely divided solid carbonaceous fuel with an oxygen containing gas in a combustion zone, said burner having a longitudinal axis and a discharge end, which burner comprises:

a central channel disposed along the longitudinal axis of said burner and having outlet at said discharge end for supplying fuel to the combustions zone;

a substantially annular channel disposed coaxially with said central channel and having a free end forming an outlet at said discharge end an outlet disposed at an angle of from about 15 to about 60 degrees with respect to said longitudinal axis to supply an oxidant gas flow to intersect and mix with solid fuel from said outlet of said central channel to the combustion zone;

a front face disposed at said discharge end of said burner and normal to the longitudinal axis thereof, said front face having a central aperture through which said fuel and oxidant gas flow to the combustion zone; said front face comprising a hollow wall member operatively connected to: (a) a supply conduit disposed to supply fluid coolant to the proximate first end of a passageway in said hollow



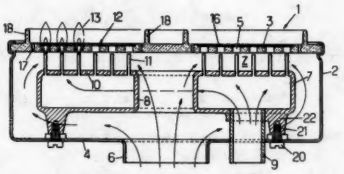
wall member; said passage having a first end and a final end, (b) a return conduit disposed to pass fluid coolant proximately from said final end of said passageway; and (c) including spiral flow means defining said passageway disposed within said hollow wall member to cause fluid coolant entering said hollow wall member from said supply conduit to flow in a spiral direction about the longitudinal axis of the burner.

4,887,963

GAS BURNERS

Joseph LeMer, Saint Thegonnec, France, assignor to Chaffoteaux Et Maury, France

Filed Mar. 21, 1989, Ser. No. 326,804
Int. Cl.[4] F23D *14/62, 14/12*
U.S. Cl. 431—354 **16 Claims**



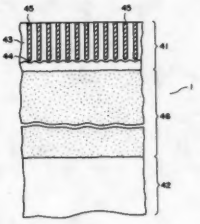
1. Gas burner comprising an air-box **(1)**, an outer wall **(3; 25,26)** of which is perforated with a large number of closely spaced orifices, a gas feed-tank **(7)** connected to a source of pressured fuel gas, this feed-tank being adapted so as to have, opposite the perforated wall of the air-box, a perforated partition **(10)** sufficiently distant from said perforated wall for the air to flow freely between said wall and said partition and a plurality of hollow needles **(11)** each connected sealingly to the edge of a hole of the partition and each opening into the central zone of the inlet of an orifice **(5; 27, 28)** of the perforated wall so as to define therewith a nozzle **(12)** for distributing the air-gas fuel mixture forming a flame **(13)** production site, characterized in that the air-box **(1)** is connected to a pressurized air source, in that each orifice **(5; 27, 28)** is formed by at least one cylindrical hole, and in that a mechanical obstacle **(16; 29)** is disposed across the central zone of the outlet of each orifice, in the axial extension of the corresponding needle **(11)**, so as to deflect the gas jet leaving this needle towards the air stream surrounding this jet.

4,887,964

IMAGE FIXING ROLLER AND IMAGE FIXING APPARATUS USING SAME

Tatsuo Takeuchi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,234
Claims priority, application Japan, Jul. 10, 1987, 62-170863; Jul. 10, 1987, 62-170864
Int. Cl.[4] F27B *9/28*
U.S. Cl. 432—60 **37 Claims**



1. An image fixing apparatus, comprising:

a couple of rotatable rollers press-contacted to each other, for fixing a toner image by passing a toner image carrying material through a nip formed between said rotatable rollers;

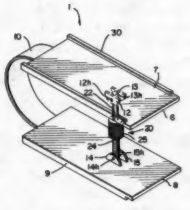
at least one of said rollers including a surface coating of anodized aluminum having fine pores filled with perfluoroalkyl compound material.

4,887,965

ADJUSTABLE MOUTH PROP

Henry L. Fox, 2265 Compass Point La., Reston, Va. 22901

Filed Aug. 2, 1988, Ser. No. 228,359
Int. Cl.[4] A61C *3/00*
U.S. Cl. 433—140 **14 Claims**



1. A mouth prop comprising:

a first member;

a second member opposed to said first member, said first and second members having respective jaw engaging surfaces for holding a resilient molding material to intimately contact opposing occlusal surfaces of a patient;

means for flexibly connecting said first and second members;

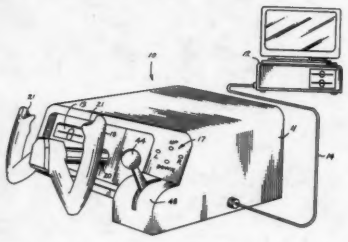
means for adjusting the distance between said opposed members to spatially arrange without interruption said occlusal surfaces to fit any mouth opening, said adjusting means having a first and second extension movably connected respectively to said first and second members.

4,887,966

FLIGHT SIMULATION CONTROL APPARATUS

Floyd R. Gellerman, 2292 Mountain Ave., Scotch Plains, N.J. 07076

Filed Jun. 30, 1988, Ser. No. 213,590
Int. Cl.[4] G09B 9/08
U.S. Cl. 434—45 7 Claims



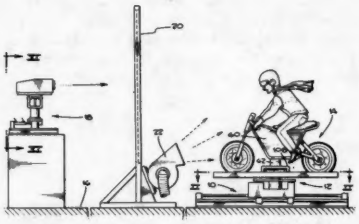
1. A flight simulation control apparatus comprising:
a console which can be mounted on a planar surface,
a cylindrical control shaft mounted in said console for reciprocal linear sliding and reciprocal rotary movement,
a control yoke on the end of said control shaft for controlling movement of the shaft,
trigger buttons on the ends of the control yoke to activate a firing circuit,
a throttle lever mounted on said console to activate a throttle circuit,
a wiring harness for connecting said controller to a computer, and
a set of four LEDs on the front of the console to indicate actions of the control shaft, and
wherein said control yoke is in the shape of a "U" and is connected to the forward end of the control shaft at the bottom of the "U" shaped portion, and
wherein said control shaft is mounted in a hole in the front of said console, and
wherein said control shaft is supported inside said console by two blocks which are parallel to the front of the console and perpendicular to the base of said console,
wherein each of the two block has a hole to receive the shaft, and
wherein each of the holes are coaxial with the first hole in front panel of the console and large enough to allow the shaft to pass through and rotate, and
wherein between the blocks supporting the control shaft there is a saddle shaped member comprising,
two flat plates which are coplanar with the rotational axis of the control shaft and extend outwardly from the exterior surface of the control shaft,
two flat semi-circular side members with a semi-circular cutout, thereby forming a half annular member,
wherein said side member are located with the cutout portion against the curved surface of the control shaft and with the flat part of the perimeter of the side member in contact with the forward and rearward edges of the projecting flat plates which are coplanar with the control shaft axis, and
wherein there are switches mounted around the saddle shaped member for providing directional inputs to the computer comprising,
spring biased switches mounted in a plane parallel to the plane of the support blocks, and beneath the flat plate and sized so that they touch the bottom of the plate when in a neutral state, so that they will be compressed when the shaft is rotated thereby providing a left and right signal,
spring biased switches which are mounted on the support blocks perpendicular to the surface thereof and facing the semi-circular side members of the saddle, and sized to the fully extended and touching the surface of the side members when in a neutral state, so that fore and aft movement of the shaft and saddle will compress the switches and provide an up and down signal to the computer, and
wherein the turn switches under the flat plates are mounted at an angle from vertical but still in a parallel plane with the blocks, so that when the saddle rotates and the spring is fully compressed, the switch is at a right angle to the plane of the plate, and
wherein each of the springs has a return spring of sufficient size to rebound after compression and return the control shaft to a neutral position.

4,887,967

HIGH PERFORMANCE MOTORCYCLE SIMULATOR

Howard Letovsky, Los Angeles, and Bernard Fried, Beverly Hills, both of Calif., assignors to Bernard Fried Racing Enterprises, Inc., Beverly Hills, Calif.

Filed Mar. 16, 1989, Ser. No. 324,172
Int. Cl.[4] G09B 9/04
U.S. Cl. 434—61 27 Claims



1. A motorcycle simulator which is capable of movement with six degrees of freedom to provide an operator with a realistic simulation of riding a motorcycle, said simulator comprising:
a support structure having a left side, a right side, a front end and a rear end;
a motorcycle mount assembly attached to said support structure;
a motorcycle frame having a front end and a rear end and including a front fork assembly, main frame and rear fork assembly wherein said motorcycle frame is attached to said mount assembly at said main frame;
sway means for controllably moving said motorcycle mount assembly between the left and right sides of said support structure;
surge means for controllably moving said motorcycle mount assembly between the front and rear ends of said support structure;
roll means for controllably moving the motorcycle frame from a vertical position to inclined positions on the left or right side of said vertical position;
yaw means for controllably pivoting the motorcycle mount assembly to provide horizontal rotation of said motorcycle frame relative to said support structure;
front fork elevator means for controllably lowering and raising the front end of said motorcycle frame;
rear fork elevator means for controllably lowering and raising the rear end of said motorcycle frame independently of said front fork elevator means wherein said sway means, surge means, roll means, yaw means, front fork elevator means and rear fork elevator means can be controlled to provide movement of said motorcycle frame with six degrees of freedom to thereby provide a realistic simulation of riding a motorcycle.

4,887,968

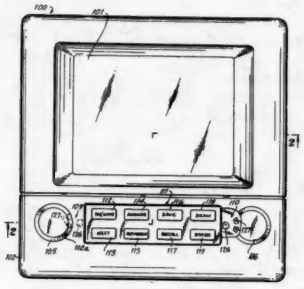
ELECTRONIC SKETCHING DEVICE

James C. Wickstead, Mendham, and Gerald P. Selden, Blairstown, both of N.J., assignors to The Ohio Art Company, Bryan, Ohio

Continuation of Ser. No. 808,919, Dec. 13, 1985, Pat. No. 4,764,763. This application Apr. 8, 1988, Ser. No. 179,148

Int. Cl.[4] G09G *1/00*

U.S. Cl. 434—85 65 Claims



1. A dedicated portable electronic sketching device, comprising:

display means for providing a visual representation of a sketch on a display area;

manually actuatable means for moving a cursor on the display area;

storage means for storing a plurality of sketches;

means for selectively storing in the storage means placements of the cursor on the display area as pixels for display by the display means to create a sketch on the display area, coupled to the means for moving the cursor and the storage means;

the storage means, together with the means for moving a cursor and the means for selectively storing the placements of the cursor, being adapted to modify each of the sketches by changing the pixels for display by the display means of a sketch in the storage means;

manually actuatable sketch selection means coupled to the storage means for selecting a stored sketch for display on the display area and modification by the means for moving a cursor and means for selectively storing the placements of the cursor, and for selecting a stored sketch for addition to a stored sequence of sketches;

manually actuatable sketch copying means for copying a selected stored sketch, without erasing said selected sketch from the storage means, for display in the display area and modification by the means for moving a cursor and means for selectively storing the placements of the cursor; and

animation means for creating and storing a sequence of the selected stored sketches coupled to the storage means to enable the display of said sequence of sketches on the display area, the animation means including manually actuatable addition means for adding the selected sketch to the sequence;

the display means, means for moving the cursor, storage means, means for selectively storing the placements of the cursor, sketch selection means, sketch copying means and animation means being dedicated to define a portable electronic sketching device.

4,887,969

IC SOCKET

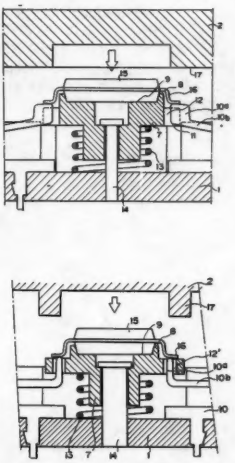
Shunji Abe, Yokohama, Japan, assignor to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan

Filed May 19, 1988, Ser. No. 195,840

Claims priority, application Japan, May 22, 1987, 62-126337

Int. Cl.[4] H01R *23/72*

U.S. Cl. 439—73 3 Claims



1. An IC socket for an IC package of the type having four sides and a plurality of outwardly extending IC terminals, said socket comprising:

a socket body defining an IC package accommodating space therein;

an IC package mounting table vertically and horizontally movably disposed within said IC package accommodating space;

means on said IC package mounting table for receiving and positioning an IC package thereon, said receiving and positioning means including a positioning wall for regulating the position of four sides of an IC package when an IC package is vertically received on said IC package mounting table in the direction of insertion;

a plurality of positioning grooves defined on said IC package mounting table for guiding and positioning a plurality of resilient contact pieces;

a plurality of contacts attached to said socket body, each one of said plurality of contacts having a resilient contact piece for contacting one of the plurality of outwardly extending IC terminals of an IC package when received on said IC package mounting table, and said plurality of resilient contact pieces being positioned by said plurality of positioning grooves on said IC package mounting table;

a coil spring means attached to said socket body and to said IC package table for resiliently biasing said mounting table vertically upwardly in the direction of insertion of an IC package and for causing horizontal movement of said mounting table when a horizontal force is applied to said mounting table;

a pressing cover pivotably attached to said socket body for pressing against an IC package received on said IC package mounting table against the vertical and horizontal bias of said coil spring means and for pressing the plurality of outwardly extending terminals of an IC package into contact with said plurality of resilient contact pieces; and

wherein, when an IC package is received on said IC package mounting table said pressing cover is pivoted against the IC package and presses the plurality of outwardly extending terminals of the IC package against said plurality of resilient contact pieces, and said pressing cover further presses the IC package against the horizontal and vertical bias of said coil spring means whereby said positioning wall further regulates the positioning of the IC package on said mounting table.

4,887,970

CLAMP FOR CONNECTING TOGETHER A GROUND LEAD AND A GROUND ROD

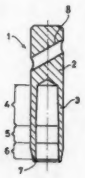
Gerardus J. H. den Hartog, Nunspeet, Netherlands, assignor to Aarding Non Ferro Werk B.V., Nunspeet, Netherlands

Filed Jul. 8, 1988, Ser. No. 216,870

Claims priority, application Netherlands, Jul. 23, 1987, 8701746

Int. Cl.[4] H01R *4/66*

U.S. Cl. 439—92 **3 Claims**



1. A clamp for connecting together a ground lead and a ground rod, comprising a clamp body with a cavity which surrounds the rod, wherein said cavity is a blind cavity having a conical portion at the closed end of the cavity extending over a distance which is at least 1.5 times as large as the diameter of the rod for which the clamp is intended, a cylindrical cavity portion contiguous with said conical portion, ending in a conical portion widening near the opening end of the cavity, and wherein the clamp body further has a solid portion in which a separate hole is provided in which a wire is secured by compression, said wire projecting outside the hole at least by a length such that it is possible to connect this wire to another conductor.

4,887,971

RE-SHIELDED COUPLING PART

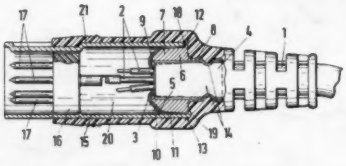
Oswald Reuss, Unterelsbach, and Franz Rutterfschmidt, Heustreu, both of Fed. Rep. of Germany, assignors to Preh, Elektrofeinmechanische Werke Jacob Preh, Nachf, GmbH & Co., Bad Neustadt/Saale, Fed. Rep. of Germany

Filed Nov. 10, 1988, Ser. No. 269,612

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1987, 8715349

Int. Cl.[4] H01R *13/648*

U.S. Cl. 439—98 **5 Claims**



1. An RF-shielded coupling part for a multiwire cable having a shielding sheath within its jacket, in which the shielding sheath, in a contact area stripped of the jacket, is in an electrically conductive connection to a metallic shield, further comprising:

a metallic stopper pushed onto the jacket surrounding the circumference of the jacket and secured in position in a direction longitudinal to the cable; wherein the contact area of the shielding sheath is solderlessly clamped in between the stopper and the shield; and

wherein the stopper sits in a close relationship to the shield about its entire circumference and the shield is held in a force-fit around the stopper in the longitudinal direction of the cable;

wherein the stopper comprises a conical circumferential surface onto which the shield is slipped to form a tight fit;

wherein the stopper comprises a web as a stop for an edge of the shield; and

wherein the web is interrupted by recesses, through which lugs on the shield project, which lugs are bent and reach behind the stopper.

4,887,972

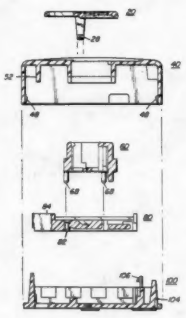
SNAP-TOGETHER ENCLOSURE FOR A TELEPHONE JACK RECEPTACLE

Kenneth W. McLean, London; Gerd Kuhfus, Dorchester, and Charles R. S. Walker, London, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jan. 12, 1989, Ser. No. 296,648

Int. Cl.[4] H01R *13/44*

U.S. Cl. 439—137 **24 Claims**



1. A snap-together enclosure for a jack receptacle, said enclosure comprising:

a shutter having a front surface and a back surface, said shutter further having distally spaced elastically deformable elongate members extending from said back surface, each of said elongate members having a tab distally located from said back surface of said shutter; and,

a cover having a front face, a back surface, and opposing parallel side walls, said front face having at least one opening defining interfering ridges, said shutter being inserted through said at least one opening by elastically deforming said elongate members which snap back to their original shape after said tabs pass said interfering ridges, wherein said tabs and said interfering ridges interact to prevent said shutter from being removed from said cover, said shutter being slidable within said at least one opening; wherein a jack body encased in said enclosure has opposing parallel side walls, a plug receiving cavity and jack posts, said opposing parallel side walls interacting, after assembly of said enclosure, with back walls of said elongate members of said shutter to prevent said elongate members from elastically deforming, thereby preventing removal of said shutter from said cover.

4,887,973

CONFORMING DEVICE FOR A FLEXIBLE FILM PROVIDED WITH PROJECTING MOUTHPIECES

Etienne Susini, Villecresnes, France, and Pierre Soubrier, Brussels, Belgium, assignors to Baxter International Inc., Deerfield, Ill.

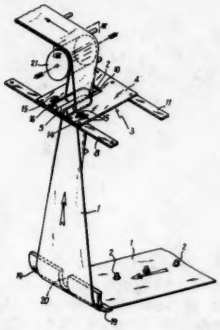
PCT No. PCT/FR87/00171, § 371 Date Mar. 2, 1988, § 102(e) Date Mar. 2, 1988, PCT Pub. No. WO87/07245, PCT Pub. Date Dec. 3, 1987

PCT Filed May 20, 1987, Ser. No. 155,925

Claims priority, application France, May 21, 1986, 86 07207

Int. Cl.[4] B65H *45/09;* **B29C** *53/04;* **B31B** *23/00*

U.S. Cl. 493—213 **8 Claims**



1. A shaping device for a web of flexible film having projecting ports, the shaping device including a shaping plate which extends in a direction transverse to the film and includes a slit having two arms joined together by a connecting member, and an opening adjacent to the slit, the opening being located so that the ports will be positioned along one edge of the shaped film at the exit of the shaping device, the shaping device including a return roller having an end that is recessed relative to an edge of the folded film having the ports that are positioned downstream from the shaping plate; the shaping device further including movable lug means affixed to the shaping plate, in a direction transverse to the plate, the lug means comprising a small plate positioned flat against the shaping plate and affixed to the plate by movable means.

4,887,974

CONNECTOR

Yoshiaki Ichimura, Tokyo; Katumi Takegawa, Higashiyamato; Yoshinori Mizusawa, Tokyo; Mitsuo Komoto, Tokyo, and Shoji Umesato, Tokyo, Japan, assignors to Japan Aviation Electronics Industry, Limited and NEC Corporation, both of Tokyo, Japan

Filed Jan. 27, 1989, Ser. No. 302,515

Claims priority, application Japan, Feb. 3, 1988, 63-13384; Feb. 3, 1988, 63-13387

Int. Cl.[4] H01R *13/62*

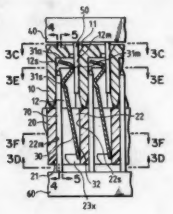
U.S. Cl. 439—259 **11 Claims**

1. A connector comprising:

a top housing having arrays of first pin insertion holes made in its upper panel and arrays of first housing chambers formed therein, each first housing chamber extending from the corresponding first pin insertion hole to the lower panel of the top housing and having a first wall surface with which a terminal pin inserted thereinto through the corresponding first pin insertion hole makes contact in its lengthwise direction and a second wall surface opposite the first wall surface;

a bottom housing disposed with its upper panel held in contact with the lower panel of the top housing and slidable relative thereto, the bottom housing having arrays of second pin insertion holes made in its lower panel and arrays of second housing chambers formed therein, each second housing chamber extending from the corresponding second pin insertion hole to the upper panel of the bottom housing;

narrow, strip-shaped resilient metal socket contactors, each



extending across and housed in each pair of first and second housing chambers;

means for holding the top and bottom housings together so that they are slidable relative to each other; and

drive means for sliding the top and bottom housings relative to each other.

4,887,975

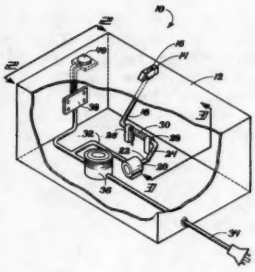
FUSED ELECTRICAL RECEPTACLE

Ronald L. Jarred, 608 S. 20th, Leavenworth, Kans. 66048

Filed Mar. 8, 1989, Ser. No. 320,583

Int. Cl.[4] H01R *13/68*

U.S. Cl. 439—490 **5 Claims**



1. A fused electrical receptacle, comprising:

a housing;

a power cord extending from said housing for connection to a conventional AC outlet;

said power cord extending to an electrical socket on said housing for connection of an electrical appliance to said socket;

a fuse within said housing connected to said power cord; and

a pop up flag for indicating when said fuse is blown.

4,887,976

ELECTRICAL TERMINALS FOR FLAT POWER CABLE

Glenn E. Bennett, Glendale; John Kevin Daly; Robert K. Grebe, both of Scottsdale, and John E. Lucius, Glendale, all of Ariz., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 18, 1988, Ser. No. 233,684

Int. Cl.[4] H01R *13/00*

U.S. Cl. 439—492 **20 Claims**

1. A transition adapter for termination to a flat cable for providing an electrical interface with another electrical article, comprising:

a metal member having a termination section, a plate section extending from said termination section, and a plurality of first and second spring arms coextending from said plate section outwardly from said termination section, said first spring arms including first free ends extending forwardly and outwardly from the plane of said plate section in a common first direction, and said second spring arms including second free ends extending forwardly and outwardly from the plane of said plate section in a common

second direction, said first and second free ends defining a region adapted for receiving a blade-like contact member therebetween for mating and establishing an electrical interface therewith, whereby during mating with the contact member said first free ends engage the contact member and initiate the deflection of said first spring arms in said first direction by the contact member and said second free ends engage the contact member and initiate the deflection of said second spring arms in said second direction.

4,887,977

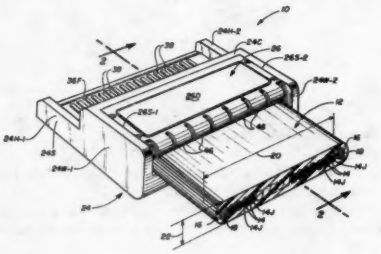
CABLE CONNECTOR HAING A RESILIENT COVER

Timothy A. Lemke, Carlisle, Pa., assignor to E. I. DuPont De Nemours and Company, Wilmington, Del.

Filed Jun. 15, 1988, Ser. No. 209,486

Int. Cl.[4] H01R *9/07*

U.S. Cl. 439—497 **8 Claims**



1. A connector for a flat cable comprising:

a base having a floor and first and second sidewalls;

a cover having a leading edge and a trailing edge, a flap disposed adjacent the trailing edge of the cover,

the base and cover, when conjoined, defining a cable receiving volume therebetween, the flap being bent with respect to the cover so that the flap lies outside of the cable receiving volume,

the flap being resiliently deflectable by a cable as the same is received within the cable receiving volume to impose a clamping force on the cable which clamps the same between the cover and the base.

4,887,978

INTERLOCK DEVICE FOR CONNECTOR-JUNCTION BLOCK ASSEMBLY

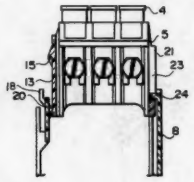
Yoshihiro Murakami, Aichi, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Aug. 17, 1988, Ser. No. 233,004

Claims priority, application Japan, Aug. 19, 1987, 62-125162[U]

Int. Cl.[4] H01R *13/74*

U.S. Cl. 439—553 **8 Claims**



1. An interlock device for a connector—junction block assembly wherein said connector includes connector terminals accommodated in an insulating housing, said junction block forming therein a mounting framework for slidably detachably mounting said connector therein, characterized in that:

said insulating housing is provided at one side wall thereof with an insertion guide extending in a direction of inserting the connector into said mounting framework, said insertion guide being provided at an upper half portion thereof with a first lock pawl of wedge shape having an upwardly tapered slide surface and downwardly facing horizontal lock surface, and a second lock pawl arranged at immediately below and close to the first lock pawl, said second lock pawl having a downwardly tapered slide surface and an upwardly facing lock surface; and

said mounting framework is provided on a protion of an inner wall thereof confronting said one side wall of the insulating housing with guide rails for cooperating with said insertion guide on the insulating housing, and within a cavity defined between said guide rails and the inner wall of the mounting framework are provided a first release lever of resilient material and a second release lever of resilient material extending upwardly from said mounting framework from said inner wall, said first release lever being provided on an inner surface thereof with a third lock pawl having a downwardly tapered surface and an upwardly facing lock surface, said third lock pawl being adapted for engagement with said first lock pawl when said connector and said junction block are interlocked, said second release lever being provided on the inner surface thereof with a fourth lock pawl having an upwardly tapered slide surface and a downwardly facing lock surface, said fourth lock pawl being adapted for the engagement with said second lock pawl when said connector and said junction block are interlocked;

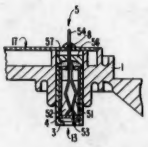
whereby there is provided a double interlock mechanism wherein after the interlock is effected by the manipulation of said first release lever said first and third lock pawls can be disengaged from each other thus allowing the connector to be pulled downwardly relative to the mounting framework while by the manipulation of said second release lever said second and fourth lock pawls can be disengaged from each other thus allowing the connector to be pulled upwardly relative to said mounting framework.

4,887,979

WATER-PROOF OUTDOOR TAP WITH IMPROVED WATERPROOF CONNECTOR

Leon D. Jacobs, Hicksville, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Filed May 27, 1988, Ser. No. 199,642
Int. Cl.[4] H01R *13/73*
U.S. Cl. 439—578 1 Claim



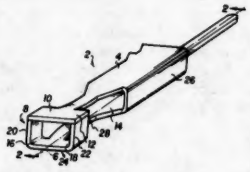
1. A waterproof outdoor tap distributor of electrical signals comprising a connector having an electro-pin formed by a single piece of metal formed into two sheets folded to face and press against each other and disposed within a fixed tube in said connector, said electro-pin having a first end portion forming an internal cavity for said connector and an opposite end portion forming a signal transmission point, characterized in that said sheets have unequal sizes, the first sheet being approximately half as long as the second sheet, said second sheet having a portion emerging from said fixed tube so as to form said signal transmission point and said first sheet being substantially disposed within said fixed tube and having an end portion covered with at least one type of waterproof compound so as to block the passage of liquids from said internal cavity to said transmission point.

4,887,980

PRELOADED ELECTRICAL CONTACT

Stanley R. Siegrist, Warren, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Oct. 3, 1988, Ser. No. 253,172
Int. Cl.[4] H01R *13/11*
U.S. Cl. 439—842 18 Claims



1. An electrical contact comprising:

a first beam which is electrically conductive and extends in the direction of a longitudinal axis, one end of said first beam including a pair of first arms each of which extends in an opposite direction to form a T-shaped end portion of said first beam, said one end of said first beam and said pair of first arms terminating in a single plane which is transverse to said longitudinal axis;

a second beam spaced from said first beam, said second beam being electrically conductive and extending in the direction of said longitudinal axis, one end of said second beam including a pair of second arms, each arm of said pair of second arms having an end which is turned towards an adjacent arm of said pair of first arms; and

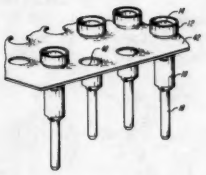
a bridging portion which is electrically conductive and which joins said first beam and said second beam, at least one of said beams being spring biased toward the other of said beams by being bowed inwardly toward the other of said beams, each arm of said pair of first arms engaging a respective one of said turned ends.

4,887,981

ELECTRONIC SOCKET CARRIER SYSTEM

Neil F. Damon, Fort Pierce, Fla., and Ronald E. Senor, North Attleboro, Mass., assignors to Augat Inc., Mansfield, Mass.

Filed Nov. 25, 1987, Ser. No. 125,349
Int. Cl.[4] H01R *9/24*
U.S. Cl. 439—885 3 Claims



1. An electronic socket for mounting on a flexible carrier strip, comprising:

a metal sleeve having an internal bore and contacts therein for engaging a lead of an electronic component, the bore having a lead entry at an upper open end;

a first plurality of circumferentially spaced barbs disposed at a first axial position on the sleeve; and

a second plurality of circumferentially spaced barbs disposed at a second axial position in the sleeve, wherein;

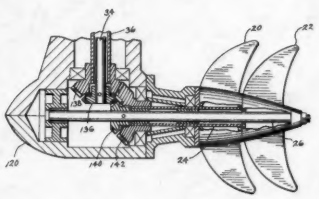
the first and second pluralities of barbs are operative to retain the socket within the plated hole of a circuit board.

4,887,982

GEAR DRIVEN MARINE PROPULSION SYSTEM WITH STEERABLE GEARCASE AND DUAL COUNTERROTATING PROPELLERS

Neil A. Newman, Omro, and Herbert A. Bankstahl, Fond du Lac, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Oct. 4, 1988, Ser. No. 253,046
Int. Cl.[4] B63H *5/10*
U.S. Cl. 440—81 8 Claims



1. In a marine drive for a boat, said marine drive including an engine having a rotatable output shaft and a depending gearcase, the improvement comprising:

a first propeller shaft rotatably mounted to said depending gearcase;

a second propeller shaft rotatably mounted to said depending gearcase, said firsst and second propeller shafts being disposed one within the other, and being substantially coaxial;

a first propeller mounted to said first propeller shaft;

a second propeller mounted to said second propeller shaft;

a pair of coaxial shafts extending longitudinally through said gearcase, and said coaxial shafts being interconnected with said engine output shaft so as to be rotatable in re-

sponse to rotation thereof, wherein the inner one of said coaxial shafts is connected directly to said output shaft so as to rotate in the same direction as said output shaft;

counterrotation means for driving said pair of axially extending shafts in opposite rotational directions in response to rotation of said output shaft, said counterrotation means being disposed between said output shaft and the outer one of said coaxial shafts for rotating said outer coaxial shaft in a direction opposite that of said inner coaxial shaft; and

gear means interposed between said first and second propeller shafts and said pair of coaxial shafts for providing counterrotation of said first and second propeller shafts, and thereby said first and second propellers, in response to rotation of said pair of coaxial shafts, said gear means comprising:

a first driven gear fixed to the inner one of said propeller shafts;

a second driven gear fixed to the outer one of said propeller shafts;

a first drive gear fixed to the inner one of said pair of coaxial shafts and engageable with said first driven gear; and

a second drive gear fixed to the outer one of said pair of coaxail shafts and engageable with said second driven gear;

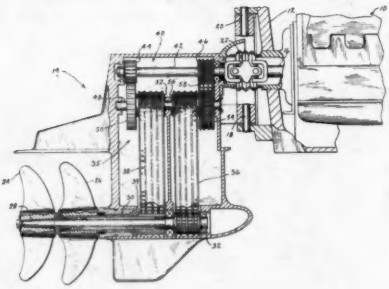
so that said first and second driven gears are driven in opposite rotational directions.

4,887,983

CHAIN DRIVE MARINE PROPULSION SYSTEM WITH DUAL COUNTERROTATING PROPELLERS

Herbert A. Bankstahl, Fond du Lac, and Neil A. Newman, Omro, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Sep. 9, 1988, Ser. No. 242,357
Int. Cl.[4] B63H *25/42*
U.S. Cl. 440—57 **14 Claims**



1. In a marine drive for a boat, said marine drive including an engine having a rotatable crankshaft and a depending gearcase, the improvement comprising:

first and second concentric propeller shafts mounted to said depending gearcase, each said propeller shaft having a portion projecting from said gearcase;

a first propeller mounted to said projecting portion of said first propeller shaft;

a second propeller mounted to said projecting portion of said second propeller shaft;

one or more intermediate shafts disposed between said engine crankshaft and said first and second propeller shafts, said one or more intermediate shafts carrying first and second sprockets;

chain means drivingly interconnected between said first and second sprockets and said first and second propeller shafts, said chain means including a first portion for driving said first propeller shaft and a second portion for driving said second propeller shaft; and

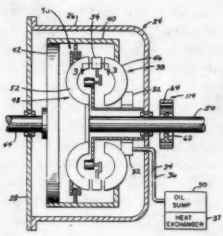
counterrotation drive means for driving said first and second portions of said chain means in opposite directions, and thereby providing rotation of said first and second propeller shafts in opposite rotational directions, wherein said counterrotation drive means causes said first and second sprockets on said one or more intermediate shafts to be driven in opposite rotational directions, thereby resulting in driving of said first and second portions of said chain means in opposite directions.

4,887,984

MARINE TRANSMISSION WITH FLUID COUPLER

Neil A. Newman, Omro, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 96,739, Sep. 15, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 255,618
Int. Cl.[4] B60K *41/02*
U.S. Cl. 440—86 **12 Claims**



1. In a marine drive for a boat, said marine drive including an engine and a propulsion unit, the improvement comprising:

a fluid coupling interposed in the marine drive between the engine and the propulsion unit, said fluid coupling including a rotatable fluid pump connected to the engine and a rotatable turbine driven by said fluid pump, said turbine being connected to an output means coupled to the propulsion unit for transferring power from said engine to said propulsion unit, said fluid coupling further including fluid direction controlling means comprising a series of vanes located beteen said fluid pump and said turbine, said vanes being movable in response to operator control for controlling the direction of impingement of fluid on said turbine, and thereby the speed and direction of rotation of said turbine.

4,887,985

SWIM FIN PROVIDED WITH A SELF-SHAPING, FLUID FLOW CONVEYING AND CONTROLLING CANAL-LIKE MEMBER

Giovanni Garofalo, Rapallo, Italy, assignor to AMF Incorporated, N.J.

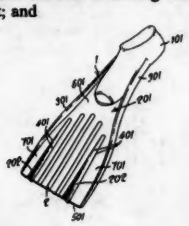
Continuation of Ser. No. 870,383, Jun. 4, 1986, Pat. No. 4,738,645. This application Feb. 3, 1988, Ser. No. 151,941
Claims priority, application Italy, May 3, 1984, 12507 A/84
Int. Cl.[4] A63B *31/08*
U.S. Cl. 441—64 **25 Claims**

1. A method of producing a swim fin having a shoe portion comprised of a first moldable material, a blade portion comprised of a second comparatively stiff material having a root portion disposed near said shoe portion and provided in a central region with a deformable self-shaping section, said shoe portion and said blade portion being connected together in a stable manner by molding in a mold said shoe portion on said blade portion proximate said root portion, said method comprising:

forming at least one longitudinal slit in the central region of

said blade portion, wherein said slit extends from a free fore end of said blade portion to an area proximate said root portion of said blade portion;

forming at least one channel extending from said shoe portion to said slit; and



allowing, concurrently with the molding operation of said shoe portion, the flow of said first moldable material into said slit to form said deformable self-shaping section.

4,887,986

SURF-RIDING BOARD OR SAILING BOARD

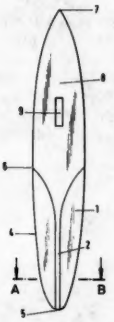
Michael Langenbach, Lindau; Dirk Cremer, and Reinhard Koppen, both of Neustadt, all of Fed. Rep. of Germany, assignors to Mistral Windsurfing AG, Bassersdorf, Switzerland

Filed Apr. 25, 1988, Ser. No. 185,388

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1987, 8705999[U]; May 15, 1987, 8707018[U]; Aug. 6, 1987, 3736006

Int. Cl.[4] A63C *15/05*

U.S. Cl. 441—74 **29 Claims**



15. A surf-riding board or sailing board comprising an inflexible floating body and a flexible stern portion, said surf-riding board or sailing board characterized in that:

(a) said inflexible floating body, at least at the upper part of the board, tapers in the rear portion of the board to a narrow bridge extending up to the stern and

(b) flexible side portions are integrated into the board on both sides of this tapering.

4,887,987

INFLATABLE EMERGENCY FLOTATION DEVICE

Csaba Kato, Houston, Tex., assignor to Aquasafe, Inc., Lorain, Ohio

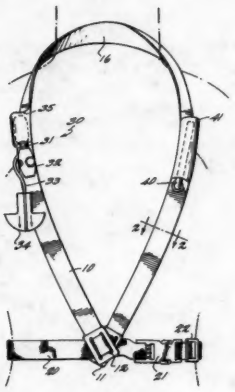
Filed Apr. 11, 1988, Ser. No. 179,937

Int. Cl.[4] B63C *9/16*

U.S. Cl. 441—96 **8 Claims**

1. An inflatable emergency flotation device to be worn around the back of the neck of the wearer and strapped to the front of the wearer's body for holding the head of a conscious or unconscious person up above water, the device comprising:

(a) folded, flexible, airtight tube means long enough to be worn looped around a person's neck and extending downward to about a person's waist, said tube means being made from a sheet of substantially constant with flexible thermoplastic material having at least three pre-formed, permanent creases extending lengthwise of said tube means and one seam running lengthwise of said tube means such that said tube means is predisposed to remain flattened when non-inflated and can be readily folded lengthwise at least once to form a folded, flat narrow strip, and said tube means having two tube ends formed integrally with said tube means, each said tube end being constituted by a respective end portion of said tube means heat sealed together crosswise thereof and throughout the thickness thereof while folded along all of said creases, so as to form a respective laminate; said tube ends being



provided with means for slidably attaching a strap to both of said tube ends;

(b) a strap slidably attached to said means for slidably attaching a strap to tube ends for securing said tube means to the front portion of the wearer's body, said strap having two strap ends and means for detachably fastening said strap ends to each other and means for adjusting the length of said strap;

(c) an inflation assembly having means for holding a carbon dioxide cylinder and means for releasing compressed gas into said tube means to cause said tube means to inflate and unfold;

(d) an oral inflation tube in communication with said tube means about one-quarter of the way along said tube means from one said tube end for inflating said tube means by blowing air into said oral inflation tube.

4,887,988

METHOD FOR THE MOUNTING OF A SHADOW MASK IN A TRICHROMATIC CATHODE TUBE AND CATHODE TUBE COMPRISING A SHADOW MASK MOUNTED ACCORDING TO THIS METHOD

Giuliano Canevazzi, Grottaferrata, and Paul Spina, Ferentino, both of Italy, assignors to Videocolor, Montrouge, France

Filed Jan. 25, 1988, Ser. No. 147,901

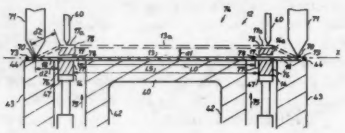
Claims priority, application France, Jan. 27, 1987, 87 00932

Int. Cl.[4] H01J *9/236*

U.S. Cl. 445—37 **16 Claims**

1. A method for mounting a shadow mask of the flat tension type in a trichromatic cathode tube wherein the mask is fixed to a frame and then the mask/frame assembly is mounted on the front envelope of the tube, the method comprising the steps of deforming said mask by mechanically stretching said mask

so as to obtain an increase in an active surface of the mask, then fixing the mask in its state of deformation to the frame by welding so that the mask is held by the frame in a state of



mechanical tension, wherein said deforming step comprises mechanically stretching the active surface of said mask by an amount at least equal to an increase in the active surface area arising during operation of the cathode ray tube.

4,887,989

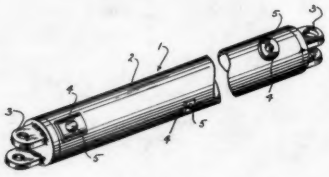
DYNAMICALLY BALANCED DRIVESHAFT AND METHOD OF PRODUCING THE SAME

Norman C. Kerecman, West Bend, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Dec. 28, 1987, Ser. No. 138,801

Int. Cl.[4] F16F *15/32*

U.S. Cl. 464—180 **5 Claims**



1. A balanced shaft assembly, comprising a tubular shaft, at least one weight engaged with the outer surface of said shaft and disposed at a location to dynamically balance said shaft, said weight being curved to conform to the shape of the shaft and having a thickness less than ¼ inch, said shaft and said weight having aligned openings, a mechanical fastener extending through said openings for securing said weight to said shaft, and sealing means disposed between said weight and said shaft for sealing the opening in said shaft.

4,887,990

GEAR-SHIFT CONTROL BICYCLES AND SIMILAR VEHICLES

Rene Bonnard, Mereville; Pierre Bonnard, Realville, and Christopher Desclozeaux, Mereville, all of France, assignors to R. Bonnard, P. Bonnard, C. Desclozeaux, and BG Innovations (SARL), France

Filed Oct. 4, 1988, Ser. No. 252,940

Claims priority, application France, Oct. 5, 1987, 87 13745

Int. Cl.[4] F16H *11/08*

U.S. Cl. 474—78 **12 Claims**

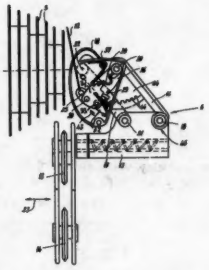
1. Gear-shift control of bicycles and the like, of the "derailleur" type with guiding means (13, 14; 52) for chain (3) that can be moved crosswise (arrows 23, 53) between at least two separate positions by a traction element such as a cable (12) from an actuating means such as a shifter (8) located remotely; characterized in that it comprises essentially, in combination:

a mobile element (26) that receives the movement of the traction element such as cable (12),

a mobile toothed element (24), connected in its movements to guiding means (13, 14; 52) of chain (3) and comprising teeth (44) whose number at least equals that of the separate positions occupied by said guiding means of the chain,

a memory element (31, 32) carried by receiving element (26) and working with the teeth of toothed element (24) and

swinging means (40, 41, 42, 43) acting on memory element (31, 32) during its movements that accompany those of receiving element (36) so that, for a movement of the



traction element such as cable (12) with a small amplitude, followed by a release, toothed element (24) is moved in a first direction along a path corresponding to the interval between two teeth (44) and, for a movement of traction element such as cable (12) of a greater amplitude, still followed by a release, toothed element (24) is moved in a second direction also along a path corresponding to the interval between two teeth (44).

4,887,991

DRIVE ASSEMBLIES FOR CHAIN-DRIVEN MINING MACHINERY

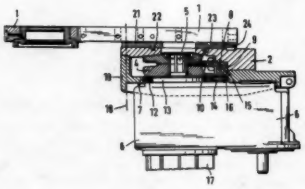
Heinrich Cwielong; Wilfried Mertens, and Gerhard Merten, all of Lünen, Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Fed. Rep. of Germany

Filed Apr. 20, 1989, Ser. No. 340,760

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814396

Int. Cl.[4] F16H *57/00*

U.S. Cl. 474—92 **16 Claims**



1. A drive assembly for a chain-driven mining machine, such as a plough; said assembly comprising a box mounted laterally to a side plate of a machine frame of a scraper-chain conveyor; a rotatable chain wheel located in the box, and around which a drive chain is entrained; a gearing unit with a drive shaft drivably connected to the chain wheel, the gearing unit being releasably attached to a side of the box remote from the side plate of the machine frame and a removable chain stripper located in the box, the chain stripper being composed of a body carrying a stripper tongue which projects within the chain wheel to separate the chain therefrom; wherein a pocket is provided in the box in which the stripper body is located, the pocket being open from the side of the box adjacent the gearing unit with the body and the pocket being shaped to lock the

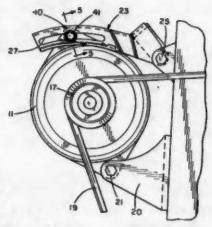
body within the pocket and the stripper body is connected to the gearing unit to form a constructional unit whereby the stripper is removed from the box when the gearing unit is detached laterally from the box.

4,887,992

ALTERNATOR BELT TENSION ADJUSTOR

Jay J. Dixon, R.R. 1, Coal City, Ill. 60416

Filed Feb. 1, 1988, Ser. No. 151,069
Int. Cl.[4] F16H *7/14*
U.S. Cl. 474—101 **9 Claims**



1. An alternator belt tension adjusting mechanism for alternator brackets and alternators, comprising; a fixed bracket including a slightly arcuate planar panel with a slightly elongated integral arcuate flange depending therefrom at one end with a first pivot mounting hole adapted to attach the bracket to a fixed support and with an arcuate elongated slot in the flange for an alternator with a pivot hole at one side thereof, a tension hole at the opposite side thereof and a central forwardly extending pulley, a fastener extending through the elongated slot in the bracket flange into the tension hole so it is radially fixed with respect to the alternator and also radially fixed transverse to the bracket slot, a fixed arcuate rack mounted on the flange directly adjacent and along but outside the slot therein, a pinion freely rotatably mounted directly on the fastener in engagement with the rack, adjacent but not in the slot, and means for rotating the pinion with respect to the rack to vary the tension on the alternator belt, said fastener providing the sole radial support for the pinion so the pinion is unsupported by the bracket slot.

4,887,993

METHOD FOR PLEATING FILM

David M. O'Connell, Tewksbury, Mass., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Division of Ser. No. 22,196, Mar. 5, 1987, Pat. No. 4,795,417.
This application Sep. 29, 1988, Ser. No. 251,414
The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.
Int. Cl.[4] B65H *45/08, 45/20*
U.S. Cl. 493—439 **1 Claim**

1. A method for feeding film from a roll and folding said film to desired width, comprising:

(a) drawing the film from the roll to a vertically curved member mounted on a frame;

(b) drawing the film down over a horizontally curved member mounted on the frame and substantially coplanar with the vertically curved member;

(c) drawing the film between

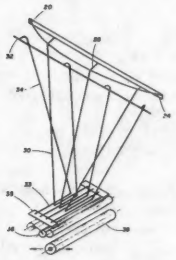
(i) a first linear member mounted on the frame below the horizontally curved member, and

(ii) a second linear member mounted on the frame downstream of the horizontally curved member;

(d) bringing the film in contact with

(i) a first series of rigid guides affixed at their upper ends to the first linear member at spaced intervals along the member, and at their lower ends to a first series of horizontal guides, and

(ii) a second series of rigid guides affixed at their upper ends to the second linear member at spaced intervals along the member, and horizontally offset from the first series of rigid guides at their respective lower ends, and



affixed at their lower ends to a second series of horizontal guides parallel to and spaced apart from the first series of horizontal guides;

the rigid guides are disposed closer together at their lower end than at their upper end such that the film folds as it feeds downward;and

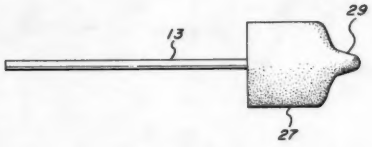
(e) gathering said folded film.

4,887,994

APPLICATOR SWABS AND METHOD OF MAKING SAME

Peter H. Bedford, 3817 Mistral Ave., Huntington Beach, Calif. 92649

Filed Jul. 6, 1988, Ser. No. 216,315
Int. Cl.[4] A61M *35/00*
U.S. Cl. 604—1 **15 Claims**



1. An applicator and cleansing swab comprising:

a stick handle to be held;

a first three-dimensional piece of open-cell polyurethane foam mounted on the stick handle at a first end so that said handle pierces the foam material;

glue on the first tip end of said handle fastening said first foam piece to said stick whereby the end of said foam adjacent to the tip of said handle is attached to said handle by the glue so that the tip of said handle is encased by the foam end;

a second three-dimensional piece of open-cell, polyurethane foam material of coarser structure than said first piece, mounted on the stick handle at the second end so that said handle pierces the foam material;

glue on the second tip end of said handle fastening said second foam piece to said stick whereby the end of said foam adjacent to the tip of said handle is attached to said handle by the glue so that the tip of said handle is encased by the foam end; and

a disinfecting fluid contained within said first piece of open-cell foam whereby said second piece of foam at the second end of the said handle may be used to scrape and clean a

wound and said first piece of foam at the first end of said handle is used to apply disinfecting fluid to the clean wound.

4,887,995

METHOD OF TREATING SICKLE CELL ANEMIA

Donald J. Abraham, Murrysville, Pa., and Paul E. Kennedy, Lawrence, Kans., assignors to University of Pittsburgh, Pittsburgh, Pa.

Filed Jan. 22, 1985, Ser. No. 693,629
Int. Cl.[4] A61M *37/00*
U.S. Cl. 604—4 6 Claims

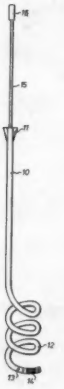
1. A method of treating a person for sickle cell anemia including administering to said person a therapeutically effective dosage of the compound ethacrynic acid by first withdrawing blood from said patient, introducing said compound into the blood and subsequently reintroducing said compound-bearing blood into said patient.

4,887,996

METHOD AND TUBE EQUIPMENT FOR SUPPLYING FLUID TO A SPACE AND DRAINING SAID SPACE

Stig Bengmark, Box 5121, S-220 05 Lund, Sweden

Filed Aug. 28, 1987, Ser. No. 90,484
Claims priority, application Sweden, Feb. 13, 1987, 8700582
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—54 1 Claim



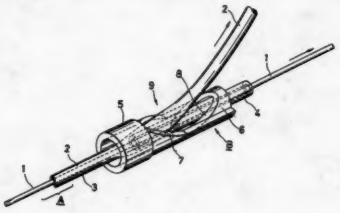
1. A method of positioning a catheter in the small intestine of a patient, said catheter including a flexible elastic tube having an inlet and an outlet, said catheter having a coiling portion which has an inherent tendency to coil up, said method including the steps of inserting a guide into the catheter to straighten up said coiling portion, inserting the catheter and guide into the patient to a position where the coiling portion is in the patient's stomach, removing the guide from the catheter so that the coiling portion of the catheter becomes coiled within the stomach, and subjecting the catheter and processed food within the stomach to peristaltic action to carry the coiling portion into the small intestine and uncoil it.

4,887,997

CATHETER FOR NASOGASTRIC INTUBATION

Yosuke Okada, Mori, Japan, assignor to Sherwood Medical Company, St. Louis, Mo.

Continuation of Ser. No. 933,642, Nov. 21, 1986, abandoned.
This application Sep. 12, 1988, Ser. No. 244,557
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—54 14 Claims



14. A method for inserting a nasal gastric tube into a patient, comprising the steps of:

inserting an elongate catheter having distal and proximal ends and a sheath tube encasing and slidably positioned about said catheter into the nasal gastric passage of a patient,

attaching a separator to the proximal end of the catheter wherein the separator includes distal and proximal ends and an inner bore formed by an inner tube extending from the proximal end of said separator to a spaced relation with an outer tube on the distal end of said separator,

removing the tubular sheath from the nasal gastric passage of the patient by manually placing the catheter and tubular sheath into the separator wherein the catheter is enclosed within the inner tube of the separator and the tubular sheath encircles a portion of the inner tube in a passageway formed between the inner tube and the outer tube,

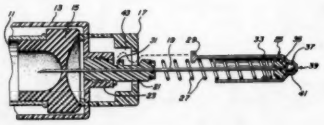
separating the tubular sheath from the catheter by moving the tubular sheath through the passageway formed between the inner tube and outer tube until the tubular sheath contacts a closed end portion of the outer tube having a side opening adjacent thereto wherein further movement of the tubular sheath causes the closed end portion of the outer tube to separate the tubular sheath from the contacting relation with inner tube and pass outwardly from the separator through the side opening.

4,887,998

HYPODERMIC NEEDLE GUARD

Catherine L. Martin, 12 Sweetwater, Irvine, Calif. 92715, and Brian R. Williams, 367 N. Richard St., Orange, Calif. 92669

Filed Dec. 14, 1987, Ser. No. 132,418
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—110 15 Claims



1. A hypodermic needle guard for preventing accidental injury after use of the hypodermic needle, comprising:

(a) a protective sheath with an aperture slidably affixed about the hypodermic needle with the needle capable of extending through the aperture;

(b) a biasing means for biasing the protective sheath to a

position projecting just beyond the tip of the hypodermic needle;

(c) a retaining means for releasably retaining the protective sheath near the base of the hypodermic needle;

(d) a triggering means for releasing the retaining means, and

(e) a locking mechanism for irreversibly locking the protective sheath about the end of the hypodermic needle when it extends beyond the tip of the needle including a non-penetrable ball member that moves in conjunction with the movement of the sheath to close the aperture.

4,887,999

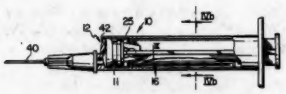
SINGLE USE-DISPOSABLE HYPODERMIC SYRINGE

Anthony Alles, Ottawa, Canada, assignor to Syntrall Canada Inc., Ottawa, Canada

Filed Apr. 26, 1988, Ser. No. 186,469

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—110 **10 Claims**



1. In a disposable hypodermic syringe having a barrel and a plunger assembly snugly mounted for reciprocation therein, a plunger movement-limiting means comprising a ratchet-like track and co-operating click means located one on an inside surface of said barrel and the other on said plunger assembly and operable to permit the plunger, on engagement of said click means with a first section of track, to move unidirectionally to perform a priming stroke and, on engagement of said click means with a second section of track, to move unidirectionally to perform a delivery stroke.

4,888,000

APPARATUS FOR THE INSERTION OF CATHETERS

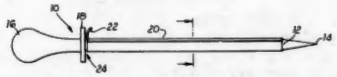
Peter H. McQuilkin, and William T. Lawrence, both of Nottingham, England, assignors to Femcare Limited, Nottingham, England

Filed Jun. 3, 1988, Ser. No. 202,055

Claims priority, application United Kingdom, Jun. 4, 1987, 8713093

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—164 **1 Claim**



1. An apparatus for inserting a supra pubic catheter in a patient comprising a substantially rigid, disposable, tubular canula and a substantially rigid disposable trocar slidably received in said canula, said trocar having distal and proximal ends and having a shoulder adjacent the proximal end thereof, said trocar having a longitudinal channel formed therein which extends along substantially the entire length thereof to permit the passage of a fluid between said trocar and said canula, said trocar being removable from said canula for installing a supra pubic catheter in said canula, said canula having distal and proximal ends and being sufficiently rigid to permit the advancement of the distal end thereof through the stomach wall of a patient by engaging the proximal end of said canula with said shoulder, said canula including a pair of closely spaced longitudinally extending frangible sections of reduced wall thickness which define a longitudinally extending removable section therebetween, said removable section being removable from the remaining portion of said canula to form a longitudinally extending open slot in said canula which extends along the entire length thereof, said canula being removable from a supra pubic catheter received therein by removing said removable section from the remaining portion of said canula and passing said catheter through said slot.

4,888,001

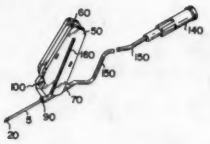
COVER FOR A DISPOSABLE HYPODERMIC NEEDLE

Stephen J. Schoenberg, 124 Amherst Ave., Atherton, Calif. 94025

Filed Jun. 1, 1988, Ser. No. 200,935

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—162 **14 Claims**



1. A cover for enclosing a disposable hypodermic needle having a cannula with a proximal end and a sharp distal end, including:

a longitudinal shank having an axial cavity for mounting over a portion of the needle;

a wing support portion formed integrally with said shank;

at least two generally flat wings formed integrally with said support portion;

at least two hinges, with one said hinge connecting each said wing with said support portion;

where said shank, support portion, wings and hinges are formed from a resilient material, with each said hinge and wing is adapted to provide a first configuration wherein each said wing lies in a first position substantially in a plane containing the needle at a location immediately adjacent the distal end, and to provide a second configuration wherein a first said wing lies in said first position and a second said wing lies in a second position in said plane, where said second position is angled away from said distal end, and to provide a third configuration wherein each said wing lies in said second position with said wings adjacent one another for forming a grip for said cover for grasping by a user of said cover for insertion into or removal from a patient, where said second configuration is adapted for securing said cover against a needle entry site of the patient, and where said first configuration is adapted for enclosing the sharp distal end for preventing injury to the user.

4,888,002

DISPOSABLE SHIELD MEDICAL SYRINGE

Paul A. Braginetz, 214 Oak Ridge Cir.; Mark R. Leadbetter, 1926 Spring Hill Rd., and Joseph Peduto, Rte. 5, all of Staunton, Va. 24401

Filed Aug. 30, 1988, Ser. No. 238,140

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—195 **9 Claims**

1. A disposable shielded medical syringe comprising a syringe barrel, a plunger slidably mounted in said barrel, a piston secured to the distal end of the plunger and being in sealing, sliding engagement with the inner wall of the barrel, a second piston slidably mounted in said barrel and being in sealing, sliding engagement with the inner wall of the barrel and being positioned between the distal end portion of the barrel and the plunger piston, a syringe needle extending outwardly longitudinally of the barrel at the distal end thereof, means for detach-

ably connecting the syringe needle to said second piston, means for mechanically connecting said plunger piston to said means for connecting the syringe needle to said second piston, said second piston having a configured outer surface cooperating with a similarly configured inner surface on the distal end of said barrel, to thereby prevent the second piston from rotating within the barrel when the needle is being operatively connected thereto and also preventing the second piston from rotating within the barrel when the plunger piston is being

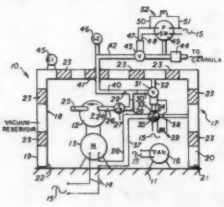
operatively connected thereto, and a medicament contained within the barrel between the plunger piston and the second piston, whereby the medicament is dispensed through the needle by pushing the plunger inwardly, whereupon the plunger piston is mechanically connected to the means for connecting the syringe needle to said second piston, and the second piston and associated contaminated needle is drawn inwardly to a shielded position within the barrel by pulling the plunger in a direction toward the proximate end of the barrel.

4,888,003

VACUUM APPARATUS

Gerald W. Johnson, and Jeffrey W. Johnson, both of 821 Peakwood, Houston, Tex. 77090

Filed Feb. 29, 1988, Ser. No. 161,492
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—319 **24 Claims**



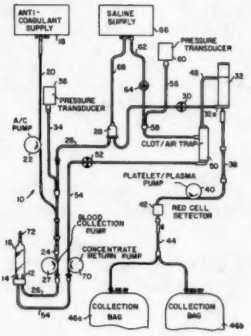
1. A vacuum apparatus for surgical aspirators comprising:
a first hollow housing comprising one or more wall members defining an enclosure,
a second hollow housing comprising one or more wall members surrounding and spaced from said first hollow housing and defining a chamber therebetween,
means sealing said chamber to provide a vacuum reservoir,
said enclosure having an opening to surrounding atmosphere,
a supporting base in said enclosure,
a vacuum pump positioned on said base in said enclosure and having an inlet and outlet,
a motor positioned on said base in said enclosure and connected to and operable to drive said pump,
power means for operating said motor,
means connecting said pump inlet to said vacuum chamber,
said pump outlet being open to said enclosure and communicating with surrounding atmosphere,
a passageway connecting said chamber to the exterior of said apparatus, and
operation of said motor and pump by said power means being effective to withdraw air from said chamber to produce a vacuum therein supplied for use through said passageway, the vacuum in said reservoir being sufficient for use over a period of time and providing sound insulation against noise produced by the apparatus.

4,888,004

METHOD AND APPARATUS FOR PURGING TUBING NETWORK OF BLOOD PROCESSING SYSTEM

Warren P. Williamson, IV, Huntington Beach, and Paul R. Prince, Fountain Valley, both of Calif., assignors to Hema-Science Laboratories, Inc., Santa Ana, Calif.

Continuation of Ser. No. 804,846, Dec. 5, 1985, abandoned. This application May 13, 1987, Ser. No. 49,029
Int. Cl.[4] A61M *3/00*
U.S. Cl. 604—45 **19 Claims**



8. Apparatus to assist in the purging of air from a blood processing system comprising:
a tubing network having at least first and second hollow needles connected to first and second portions of the tubing network, respectively;
an enclosure defining an interior chamber; and
coupling means for removably coupling said first and second needles with said enclosure such that common fluid communication between said chamber and the hollow of each said first and second needles is established to permit purging of air in said tubing network with a purge fluid.

4,888,005

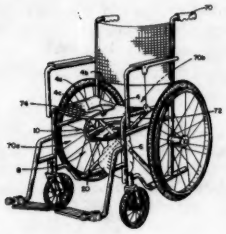
CATHETER TUBE CARRYING DEVICE AND METHOD

David L. Dingeman, Duluth, and Christine E. Hendrickson, Minnetonka, both of Minn., assignors to Cathex Tray Corporation, Duluth, Minn.

Filed Jan. 15, 1988, Ser. No. 144,259
Int. Cl.[4] A61M *1/00, 5/32*
U.S. Cl. 604—326 **15 Claims**

1. A catheter tube carrying device for use in conjunction with the use of a wheelchair by a person who must be catheterized, the wheelchair having lateral sides, a seat and cross-

braces located below the seat connecting the lateral sides, each of said lateral sides having at least one wheel in its vertical plane, said catheter tube carrying device comprising catheter tube support means for engaging catheter tubing of a gravity flow drainage system for an indwelling urinary catheter, the gravity flow drainage system including a flexible catheter drainage tube including catheter tubing and a drainage bag, the drainage tube connecting the catheter to the drainage bag such that fluid can pass from the catheter to the drainage bag



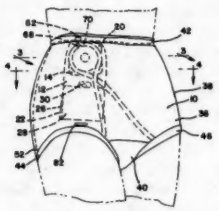
through the tube, said catheter tube support means including means for horizontally engaging the cross-braces in a location below the seat, wherein a portion of the catheter tubing is engageable in said catheter tube support means such that said portion of catheter tubing retained by said catheter tube support means can be retained in such a position that said retained tubing provides a substantially horizontal or a descending pathway for fluid which passes through the catheter tubing to the drainage bag from the catheter.

4,888,006

GARMENT TO HOLD A OSTOMY APPLIANCE

Dolores Y. Beaupied, 200 Inwood Dr., Apt. 106, Wheeling, Ill. 60090

Filed Feb. 2, 1988, Ser. No. 151,330
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—345 **7 Claims**



1. An undergarment for supporting an ostomy appliance having a flange member comprising:

front, back and crotch panels interconnected to form the garment;

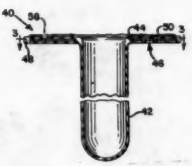
a retaining pocket interposed between said panels and connected to one of said panels with an ostomy appliance received into said pocket, said retaining pocket having an opening defined by a criss-cross arrangement means of a front and back panel formed by adjacent overlapping edges with said opening adapted to receive a flange of an ostomy appliance therethrough, said overlapping edges accommodating a flange member of an ostomy appliance at different positions of a user's body.

4,888,007

PUBIC PROPHYLACTIC

Marvin P. Loeb, Huntington Beach, Calif., and John F. Perry, Vernon Hills, Ill., assignors to Xtramedics, Inc., Deerfield, Ill.

Filed Aug. 4, 1987, Ser. No. 81,353
Int. Cl.[4] A61F *5/42*
U.S. Cl. 604—352 **12 Claims**



1. A condom having a pubic area shield comprising:

an elastic, tubular sheath member having an inner surface, an outer surface, an open proximal end, and a closed distal end, said sheath member being sized to fit onver an erect male organ so as to prevent transmission of fluid between users of said condom;

an outwardly extending shield member integrally associated with said tubular sheath member about said proximal end thereof, said shield member defining a contact face that is continuous with said inner surface, said shield member being substantially self supporting but flexible enough to conform to the human body in the pubic area; and

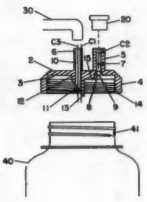
a bioadhesive on said contact face.

4,888,008

VENTED SPIKE CONNECTION COMPONENT

Herbert F. D'Alo, Madison, and Christine D. Enger, Milford, both of Conn., assignors to Sherwood Medical Company, St. Louis, Mo.

Continuation of Ser. No. 21,181, Mar. 3, 1987, abandoned. This application Aug. 30, 1988, Ser. No. 239,044
Int. Cl.[4] A61B *19/00*
U.S. Cl. 604—411 **16 Claims**



1. A connection component for connection to a fluid containing bottle having an opening and a threaded connection for receiving a closure cap, comprising:

a cap shaped component body including a circular wall portion and a cylindrical threaded portion extending in one axial direction therefrom;

a pointed projecting member extending from said wall portion spaced from the center of said wall portion on the same side as said threaded portion, said projecting member having a fluid receiving passage passing through said wall portion and having a fluid receiving opening on the side of said projecting member facing away from said center;

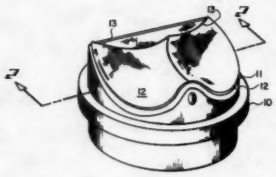
and an air vent on said wall portion spaced from said center in a position opposite said projecting member.

4,888,009

PROSTHETIC HEART VALVE

David M. Lederman, Marblehead; Param I. Singh, Lexington, and Clair L. Strohl, Jr., Norfolk, all of Mass., assignors to Abiomed, Inc., Danvers, Mass.

Continuation of Ser. No. 720,361, Apr. 5, 1985, abandoned. This application Oct. 31, 1986, Ser. No. 926,816
Int. Cl.[4] A61F 2/24
U.S. Cl. 623—2 1 Claim



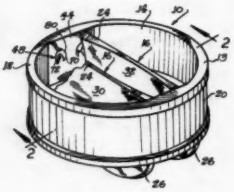
1. A prosthetic heart valve that inhibits chronic thrombus formation and tissue overgrowth, said valve having upstream and downstream ends and including a suture ring which surrounds and supports a generally cylindrical valve body which, in turn, supports a plurality of flexible valve leaflets, said heart valve also comprising an extension of the valve body upstream from the suture ring, said upstream extension extending at least about 1.5 mm to about 3.6 mm upstream and an extension of the valve body downstream from said suture ring, said downstream extension extending about 1.0 mm to about 1.7 mm so as to inhibit chronic thrombus formation and tissue overgrowth from said suture ring around said upstream end of said body to the interior of said body.

4,888,010

HEART VALVE PROSTHESIS WITH IMPROVED RECESS DESIGN

Jack C. Bokros, Austin, Tex., assignor to Carbomedics, Inc., Austin, Tex.

Filed Dec. 14, 1988, Ser. No. 284,103
Int. Cl.[4] A61F 2/24
U.S. Cl. 623—2 11 Claims



1. A heart valve prosthesis comprising:

a generally annular valve body having an interior surface defining a central passageway through which blood flows;

a pair of leaflet occluders proportioned to be pivotally received within said valve body and to move between an open position permitting blood flow in a downstream direction and a closed position blocking the reverse flow of blood in an upstream direction, said leaflet occluders each having a generally flat upstream surface, an opposed generally concave downstream surface, a diametral edge between the upstream and downstream surfaces for mating with the other occluder and an arcuate edge also between the upstream and downstream surfaces opposite the diametral edge and said occluders further comprising a pair of opposed outwardly protruding mounting ears adjacent the diametral edge for pivotal mounting to said valve body, said mounting ears having a generally part-conical upstream surface, and an opposed downstream surface about which the leaflet is rolled; and

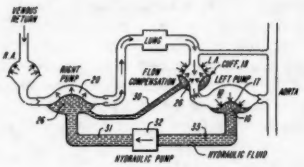
said valve body defining for each leaflet occluder a pair of recesses each having a varying depth extending into the valve body, and each recess forming a generally crescent-shaped opening in the valve body inner surface, each said recess further including first and second opposed arcuate end portions with a sidewall extending between said end portions for engaging an upstream surface of a leaflet mounting ear at least during valve closing and a generally opposed rounded convex surface adjacent a downstream end of the recess for guiding the downstream surface of said leaflet mounting ear at least during valve opening.

4,888,011

ARTIFICIAL HEART

Robert T. V. Kung, Andover, and Param I. Singh, Lexington, both of Mass., assignors to Abiomed, Inc., Danvers, Mass.

Filed Jul. 7, 1988, Ser. No. 216,028
Int. Cl.[4] A61F 2/22
U.S. Cl. 623—3 7 Claims



1. An artificial heart for implantation in the circulatory system of a human body comprising,

first and second pumping chambers, each formed of a generally rigid outer shell and including a flexible membrane dividing each chamber into two sections, one section being a blood flow section and the other being a hydraulic section;

an inlet port and an outlet port included in each blood flow section, said inlet and outlet ports being fluidically coupled to said patient's circulatory system, each of said hydraulic sections having an inlet port;

hydraulic pumping means having first and second states, said hydraulic pumping means being hydraulically coupled to the inlet ports of said first and said second chamber hydraulic sections, said hydraulic pumping means in said first state pumping hydraulic fluid in a direction toward said first chamber hydraulic section and away from said second chamber hydraulic section, and in said second state pumping hydraulic fluid away from said first chamber hydraulic section toward said second chamber hydraulic section;

a flexible membrane forming a wall of a sealed compartment placed so that changes in pressure of blood in said circulatory system produce changes in position of said membrane such that the volume of said compartment decreases with increase in blood pressure and increases with decreases in blood pressure, said sealed compartment being substantially smaller in volume than the hydraulic sections of said pumping chambers and having a hydraulic inlet port, hydraulic coupling means continuously fluidically coupled between said sealed compartment and the input port of said second pumping chamber hydraulic section; and

control means connected to said hydraulic pumping means for switching said hydraulic pumping means from said first state to said second state.

4,888,012

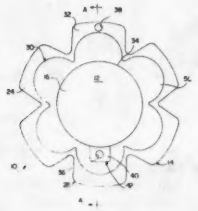
INTRAOCULAR LENS ASSEMBLIES

Gerald Horn, 74 Golf Rd., Golf, Ill. 60029, and Kenneth Spears, 9141 Dr. Korczak Ter., Skokie, Ill. 60076

Filed Jan. 14, 1988, Ser. No. 144,318

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **21 Claims**



1. An intraocular lens assembly for implantation into the posterior chamber of a human eye in operative engagement with a circumferentially extending ciliary muscle of said eye comprising a central lens supported by a ring structure, said ring structure including a compressively deformable outer ring member having a web member extending radially inwardly of said outer ring member, said web member being connected at its distal end to said central lens, said outer ring member being adapted to apply a circumferentially continuous force to said central lens via said web member when said muscle is in a relaxed condition to stretch said central lens radially outwardly after implantation, said outer ring member being further adapted to operatively and abuttingly engage said circumferentially extending muscle after implantation so that said outer ring is compressed by said muscle upon contraction of the muscle to relax said force applied by said outer ring member to said central lens via said web member to enable said central lens to essentially uniformly deform about its circumference and alter its curvature.

4,888,013

HAPTIC TO OPTIC ATTACHMENT FOR A SOFT IOL

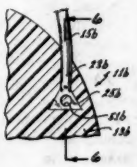
Albert C. Ting, Laguna Niguel; Timothy R. Willis, El Toro; F. Richard Christ, Orange; Steven R. Bacich, Irvine; Dean K. Pettit, Irvine; Stanley L. Van Gent, Irvine, and Jeffrey C. Day, Mission Viejo, all of Calif., assignors to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 96,745, Sep. 15, 1987, Pat. No. 4,790,846, which is a continuation of Ser. No. 806,376, Dec. 9, 1985, abandoned. This application Aug. 4, 1988, Ser. No. 228,955

The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.

Int. Cl.[4] A61F *2/16*; B29D *11/00*

U.S. Cl. 623—6 **3 Claims**



1. An intraocular lens comprising:

at least one fixation member having a proximal end portion, said proximal end portion including a filament with a region of the proximal end portion having at least one opening therein;

an optic, said proximal end portion being within said optic and attached to the optic, a portion of said optic being in said opening to form a mechanical interlock between said fixation member and the optic, said opening being at a peripheral region of the optic and being substantially smaller than said optic and

said region of the proximal end portion including an enlargement having said opening therein, said enlargement being at a peripheral region of the optic and being substantially smaller than said optic.

4,888,014

ENDOCAPSULAR INTRAOCULAR LENS

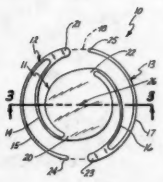
Tuan A. Nguyen, Fountain Valley, Calif., assignor to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 243,989, Sep. 13, 1988. This application Apr. 25, 1989, Ser. No. 343,033

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **4 Claims**



4. An intraocular lens, comprising:

an optic for implantation in a human eye; and

first and second fixation members attached to the optic for supporting the optic in the eye, each of the fixation members having inner and outer legs;

the inner leg of each of the fixation members extending radially outwardly and circumferentially in a first circumferential direction from a respective one of first and second attachment sites on the optic to an intermediate portion of the fixation member, said intermediate portion being substantially wider than said inner and outer legs;

the outer leg of each of the fixation members extending in a second circumferential direction along a respective one of first and second arcs from the intermediate portion of the fixation member to a distal end portion of the fixation member, which second circumferential direction is opposite to the first circumferential direction; and

the first and second arcs being concave toward the optic;

each of the outer legs having a length such that the distal end portion of each of the fixation members is disposed proximate the intermediate portion of the other fixation member.

4,888,015

METHOD OF REPLACING AN EYE LENS

Rudolph S. Domino, 228 Plainfield Ave., Edison, N.J. 08817

Filed Aug. 20, 1982, Ser. No. 409,865

Int. Cl.[4] A61F *2/16*; A61B *17/00, 17/28*

U.S. Cl. 623—6 **15 Claims**

1. A method of replacing a lens comprising:

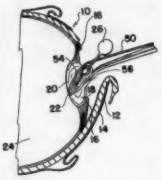
(a) displacing the cornea and the conjunctiva to provide access to the iris;

(b) positioning the iris to provide access to the anterior lens capsule;

(c) performing a generally horizontal capsulotomy incision in the anterior lens capsule;

(d) folding back the superior portion of the capsular incision to expose the apex of the lens;

(e) inserting a first portion of a removal tool between the anterior lens capsule and the anterior surface of the lens while inserting a second portion of said removal tool between the posterior lens capsule and the posterior surface of the lens;



(f) grasping the lens with said first and second portions of said removal tool and rotating the lens to dislodge it from the capsule and partially remove it from the capsule;

(g) removing the lens while keeping the capsule open;

(h) inserting a replacement lens into the capsule;

(i) withdrawing said removal tool from the capsule; and

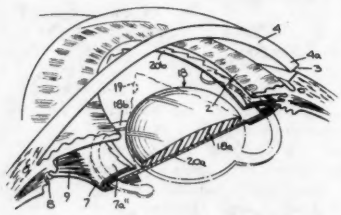
(j) repositioning the superior capsule flap, the iris, the cornea and the conjuctiva.

4,888,016

"SPARE PARTS" FOR USE IN OPHTHALMIC SURGICAL PROCEDURES

David W. Langerman, 99 Dutch Hill Plz., Orangeburg, N.Y. 10962

Filed Feb. 10, 1988, Ser. No. 154,196
Int. Cl.[4] A61F *2/14, 2/16*
U.S. Cl. 623—6 **15 Claims**



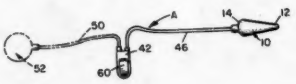
1. For use in connection with ophthalmic surgical procedures; a "spare part" adapted to be surgically introduced into an eye for the purpose of repair or reinforcement or replacement of a component of the eye, said "spare part" comprising a member of a cohesive sheet material of a cross-linked biocompatible substance, said member being preformed into the shape of an anteriorly incomplete capsular bag-like structure which includes a peripherally curved posterior wall defining a posterior capsule portion and a curved strip-like anterior wall defining an anterior capsular flap portion, with said anterior capsular flap portion and said posterior capsule portion being connected to each other along their respective curved outer peripheries, and with said anteriorly incomplete capsular bag-like structure having predetermined physical or optical properties, or both, and being adapted to the manner in which the endogenous posterior capsule of the eye is to be repaired or reinforced or replaced following an intracapsular or extracapsular cataract extraction.

4,888,017

APPARATUS OF CONTROLLING EUSTACHIAN TUBE FUNCTION

Richard A. DeVore, Richfield, and Sam E. Kinney, Moreland Hills, both of Ohio, assignors to The Cleveland Clinic Foundation, Cleveland, Ohio

Filed Jul. 15, 1987, Ser. No. 73,504
Int. Cl.[4] A61F *2/18*
U.S. Cl. 623—10 **11 Claims**



1. An implantable eustachian prosthetic system, comprising:

a generally elongated inflatable member, said inflatable member having a first end defining an inflatable dimension approximating the diameter of the eustachian tube opening for at least partial receipt therein and an opposite second end, designed to retain the inflatable member at the interface between the eustachian tube and the middle ear; and,

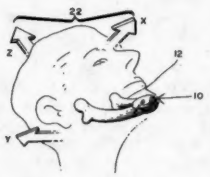
a separate pump means configured to be implanted and operatively coupled to said inflatable member, said pump means adapted for selectively inflating and deflating said inflatable member after said inflatable member is implanted so as to selectively permit and prevent communication from the middle ear through the eustachian tube.

4,888,018

METHOD OF POSITIONING AND SECURING A CHIN IMPLANT

Vincent C. Giampapa, 67 Highland Ave., Montclair, N.J. 07043

Filed Dec. 27, 1988, Ser. No. 290,711
Int. Cl.[4] A61F *2/28*
U.S. Cl. 623—16 **7 Claims**



1. A method of applying a chin implant to a human, the method comprising the steps of:

(a) positioning a resilient preformed chin implant against the area of an chin to be enhanced, said implant having an interior radius of curvature slightly smaller than the opposing radius of curvature of the area of said chin to be enhanced and which is to receive said implant;

(b) drilling a mounting pin bore through said implant and into the periostium of said area of the chin to be enhanced, said drilling being at an outward angulation in the range of 15 to 45 degrees relative to a front-to-rear vertical medial plane of the face and, concurrently, at a downward angulation in the range of 15 to 45 degrees relative to a front-to-rear horizontal plane of the face;

(c) drilling through said implant and periostium a mounting pin bore having, about said front-to-rear vertical plane, a mirror symmetry to said drilled pin bore of Step (b) above; and

(d) securely inserting, through said bores of Steps (b) and (c) above, respective mounting pins, said pins extending thru the periostium, into the outer boney table,

whereby, due to said differences in the radii of curvature of

said inner surfaces of said implant and said area of the chin to be enhanced, said two mounting pins will secure said implant at a substantially crescent shaped offset from the chin.

4,888,019

ARTICULAR PROSTHESIS AND ITS PREPARATION PROCESS

Gilbert Gauneus, Meudon; Maryvonne Nicaise, Orsay, and Kifu O. Tran, Les Ulis, all of France, assignors to Compagnie Oris Industrie S.A., Paris, France

Filed Sep. 9, 1982, Ser. No. 419,002

Int. Cl.[4] A61F 2/30

U.S. Cl. 623—18 **6 Claims**

1. A polymeric articular prosthesis having a sliding surface, wherein the prosthesis comprises a polymer and the sliding surface comprises a thin layer of a graft copolymer of polytetrafluoroethylene and said polymer, wherein said graft copolymer is obtained by grafting tetrafluoroethylene onto said polymer at said sliding surface so that the degree of tetrafluoroethylene grafting of the thin layer forming the sliding surface is 0.3 to 2.5 mg of tetrafluoroethylene per cm^2 of surface.

4,888,020

FEMUR FOR A KNEE JOINT PROSTHESIS

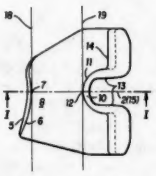
Willi Horber, Zurich, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 9, 1984, Ser. No. 587,950

Claims priority, application Switzerland, Mar. 23, 1983, 1595/83

Int. Cl.[4] A61F 2/38

U.S. Cl. 623—20 **9 Claims**



1. A femur part for a knee joint prosthesis comprising

a pair of condyle shells;

a patella shield connecting said shells together frontally and having a rearwardly facing convex surface;

a backwall connecting said shells, together dorsal and having a convex outer surface facing said patella shield and

a femoral plateau connecting said patella shield to said backwall;

wherein each said surface has a vertex line disposed in a common connecting plane, said lines being mutually juxtaposed near each other to define an acute wedge angle therebetween converging distally of from greater than 0° to 30°, said plane being perpendicular to a respective tangential plane passing through each said vertex line.

4,888,021

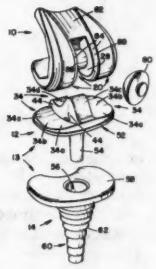
KNEE AND PATELLAR PROSTHESIS

Mark R. Forte, Pine Brook, N.J., and Douglas G. Noiles, New Canaan, Conn., assignors to Joint Medical Products Corporation, Stamford, Conn.

Filed Feb. 2, 1988, Ser. No. 151,429

Int. Cl.[4] A61F 2/38

U.S. Cl. 623—20 **14 Claims**



1. An artificial joint which can be moved between an extended position and a flexed position, said motion being composed of a minor segment which extends between the extended position and an intermediate position and a major segment which extends between the intermediate position and the flexed position, said joint comprising:

a first component which includes a first cam means and a convex bearing surface having a first portion and a second portion, the curvature of the first portion being less than the curvature of the second portion;

a second component which includes a second cam means and a concave bearing surface having a first portion and a second portion, the curvature of the first portion being less than the curvature of the second portion;

the first portion of the convex bearing surface being in engagement with the first portion of the concave bearing surface during the minor segment of the joint's motion;

the second portion of the convex bearing surface being in engagement with the second portion of the concave bearing surface during the major segment of the joint's motion, the joint moving about a fixed axis of flexion when said second portions are in engagement, said flexion occurring through sliding without rolling of said second portions relative to one another;

the first and second cam means interacting with one another during the minor segment of the joint's motion, said interaction permitting the first and second bearing surfaces to roll relative to one another without substantial sliding as the joint moves between its extended and intermediate positions so that the line of contact between the bearing surface moves towards the second portions of the bearing surfaces.

4,888,022

ENDOPROSTHESIS

Donald L. Huebsch, 3716 Prestwick Dr., Los Angeles, Calif. 90027

Continuation-in-part of Ser. No. 814,690, Dec. 30, 1985. This application Nov. 24, 1987, Ser. No. 124,983

Int. Cl.[4] A61F 2/32

U.S. Cl. 623—22 **8 Claims**

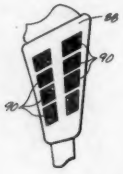
1. An endoprosthesis freely insertable into a medullary canal and thereafter immovably anchorable thereto comprising:

an elongated load bearing stem;

elastic means mounted on and extending lengthwise of said stem; and

means for compressing said elastic means radially outward

into pressurized contact with the juxtaposed surface of a medullary canal, after insertion therein, under continuously maintained elastic pressure effective to secure said endoprosthesis immovably therein,



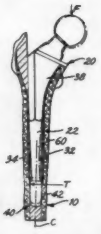
said elastic means comprising an elastomeric bladder having spaced-apart porous-surfaced plates secured to its outer surface for pressure contact with the medullary canal sufficient to promote bony ingrowth into the plates in contact with said juxtaposed surface of the canal.

4,888,023

FEMORAL PROSTHESIS WITH UNCOUPLED DISTAL TIP

Robert G. Averill, Ringwood, and Robert C. Cohen, Denville, both of N.J., assignors to Osteonics Corp., Allendale, N.J.

Filed Jan. 19, 1988, Ser. No. 145,794
Int. Cl.[4] A61F 2/32
U.S. Cl. 623—22 **14 Claims**



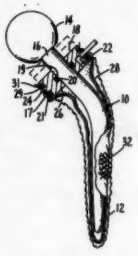
1. In a stem-type femoral prosthesis for implantation in a resected proximal end of a femur, the prosthesis including a stem to be received within the prepared femur, the stem having a proximal end, an affixation surface adjacent the proximal end for enabling the stem to be affixed in place when seated properly within the prepared femur, and a distal end spaced axially downwardly from the proximal end for reception within a passage created in the wall of the prepared femur, the improvement comprising: a distal tip integral with the distal end of the stem, the distal tip being spaced axially downwardly from the affixation surface a distance sufficient to enable seating of the distal tip within harder portions of the bone in the wall of the femur when the affixation surface is properly seated in the prepared femur, the stem including a shaft portion located between the affixation surface and the distal tip, the shaft portion having a diameter smaller than the corresponding diameter of the distal tip for enabling flexing in the shaft portion, and the distal tip having an external peripheral surface for engaging said harder portions of bone to confine the distal tip against transverse movements within the passage upon completion of the implantation, and a fixation-resistant surface finish on the external peripheral surface for maintaining the distal tip unaffixed to the femur and moveable axially relative to the wall of the femur to permit axial displacement of the distal tip and the distal end in response to forces applied to the prosthesis during use of the prosthesis.

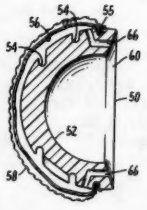
4,888,024

PROSTHETIC DEVICE AND METHOD OF FIXATION WITHIN THE MEDULLARY CAVITY OF BONES

Roy Y. Powlan, 1 Chapel Dr., Lafayette, Calif. 94549

Continuation-in-part of Ser. No. 769,309, Nov. 8, 1985, abandoned. This application Mar. 19, 1987, Ser. No. 28,104
Int. Cl.[4] A61F 2/36, 2/34, 2/32
U.S. Cl. 623—23 **18 Claims**





1. A prosthesis adapted for fixation within the medullary cavity of a human bone, said prosthesis comprising:

(a) a rigid arbor adapted to fit within the medullary cavity of the bone,

(b) locating means for selectively positioning the arbor within the medullary cavity,

(c) a nonresorbable, flexible membrane encompassing said arbor and secured to said locating means in a liquid and air tight manner, said membrane being impervious and inert to human bodily fluids,

(d) a flexible, woven sheath secured to said locating means and encompassing said arbor and membrane, and

(e) means for introducing liquid cement under pressure internally of said flexible membrane.

4,888,025

COMPOUNDS WHICH CAN BE USED FOR HAIR DYEING, PROCESS FOR THEIR PREPARATION, DYEING COMPOSITIONS IN WHICH THEY ARE PRESENT AND CORRESPONDING HAIR-DYEING PROCESS

Andrée Bugaut, Boulogne, and Alain Genet, Neuilly-Plaisance, both of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 459,964, Jan. 21, 1983, abandoned. This application Jun. 7, 1985, Ser. No. 742,240

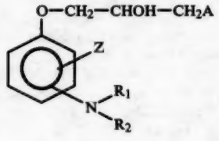
Claims priority, application Luxembourg, Jan. 26, 1982, 83900; Sep. 27, 1982, 84391

Int. Cl.[4] A61K 7/13

U.S. Cl. 8—405 11 Claims

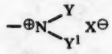
1. An aqueous hair dye composition comprising a hair dyeing amount of a hair dye compound selected from the group consisting of

(1) a compound of the formula



wherein Z is selected from the group consisting of NO_2 and NH_2,

A is selected from the group consisting of NY and



wherein Y represents two identical or different lower alkyl or lower hydroxyalkyl groups wherein each alkyl has 1–4 carbon atoms, or said two Y groups together with the nitrogen atom to which they are attached form a morpholino or piperidino ring, or when A is NY, each Y group can represent hydrogen or one Y group can represent hydrogen and the other Y group can represent alkyl or hydroxyalkyl, wherein the alkyl or each has 1–4 carbon atoms, Y^1 represents lower alkyl having 1–4 carbon atoms and X represents halogen, and

R_1 and R_2 each independently represent hydrogen, lower alkyl having 1–4 carbon atoms or hydroxyalkyl having 1–4 carbon atoms,

with the proviso that when Z represents NH_2 in a meta position relative to $—NR_1R_2$ and A represents NY and Z is in the 4 position on the benzene nucleus and $—NR_1R_2$ is in the 2-position on the benzene nucleus, and R_1 and R_2 both represent hydrogen then (a) one of the two Y groups in NY is not ethyl if the other Y group is hydrogen and (b) the two Y groups in NY do not form together with the nitrogen atom to which they are attached a morpholino or piperidino ring, and

(2) an acid salt of the compound in (1), said hair dye compound being present in an amount ranging from 0.001 to 4 percent by weight based on the total weight of said composition.

4,888,026

USE OF HYDROXYNAPHTHOQUINONES FOR DYEING HUMAN KERATIN FIBRES

Gérard Lang, Saint-Gratien; Serge Forestier, Claye-Souilly; Michel Hocquaux; Jean-Francois Grollier, both of Paris, and Georges Rosenbaum, Asnieres, all of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 445,705, Dec. 1, 1982, abandoned. This application Dec. 28, 1984, Ser. No. 689,011

Claims priority, application Luxembourg, Dec. 2, 1981, 83806

Int. Cl.[4] A61K 7/13

U.S. Cl. 8—405 16 Claims

1. A composition suitable for dyeing human hair, which comprises, in a cosmetically acceptable medium, about 0.01 to 5% of at least one 2-hydroxy-1,4-naphthoquinone of the formula:

in which R_1 denotes a hydrogen or halogen atom, or a hydroxy, alkoxy, nitro, alkyl or acyl group, and R_2, R_3, R_4 and R_5 independently of one another denote hydrogen or a hydroxy, alkoxy, alkyl or acyl group, such that at least one of the substituents R_1 to R_5 is other than hydrogen, and if R_1, R_3 and R_4 denote hydrogen, R_2 and R_5 cannot simultaneously denote hydroxy, said alkyl and alkoxy groups for R_1, R_2, R_3, R_4 and R_5 containing 1–4 carbon atoms and said acyl group for R_1, R_2, R_3, R_4 and R_5 containing 2–4 carbon atoms, said medium containing adjuvants suitable for use for hair dyeing.

4,888,027

PROCESS FOR DYEING KERATINOUS FIBERS WITH 5,6-DIHYDROXYINDOLE IN COMBINATION WITH AN IODIDE AND A HYDROGEN PEROXIDE COMPOSITION AT ALKALINE PH

Jean F. Grollier, Paris, and Didier Garoche, Levallois-Perret, both of France, assignors to L'Oreal, Paris, France

Filed Apr. 4, 1988, Ser. No. 177,323

Claims priority, application Luxembourg, Apr. 2, 1987, 86833

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.[4] A61K 7/13

U.S. Cl. 8—423 19 Claims

1. A plural stage process for dyeing keratinous fibers comprising applying to said fibers, in an amount effective to dye said keratinous fibers, a composition (A) containing, in an appropriate medium for dyeing, 5,6-dihydroxyindole, present in an amount ranging from 0.01 to 5 percent by weight, based on the total weight of said composition (A), and iodide ions, present in an amount ranging from 0.007 to 4 percent by weight, expressed as I^- ions, based on the total weight of said composition (A), the application of said composition (A) being preceded or followed by applying to said fibers composition (B) containing, in an appropriate medium for dyeing, hydrogen peroxide at a concentration ranging from 1 to 40 volumes, at an alkaline pH of less than 12.

4,888,028

WATER-SOLUBLE BLUE DYE MIXTURE AND DYEING METHOD: ANTHRAQUINONE REACTIVE DYE AND FORMAZAN REACTIVE DYE

Toshio Hihara, and Riyouichi Sekioka, both of Kitakyushu, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

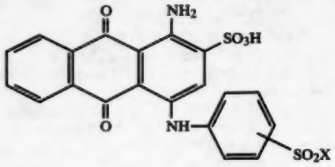
Filed Jun. 15, 1988, Ser. No. 206,727

Claims priority, application Japan, Jul. 22, 1987, 62-183119

Int. Cl.[4] C09B 67/22; D06P 1/38

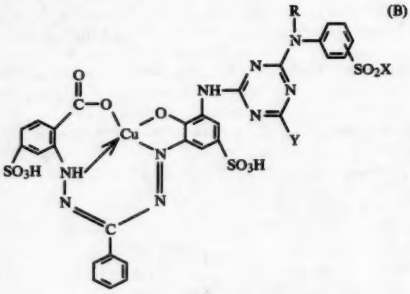
U.S. Cl. 8—549 12 Claims

1. A water-soluble dye mixture comprising a blue anthraquinone reactive dye represented in its free acid form by the formula:



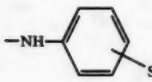
(A)

wherein X is $-CH=CH_2$ or $-C_2H_4W$ wherein W is a group removable by action of alkali and from 0.2 to 5 times by weight to said anthraquinone reactive dye of a blue formazan reactive dye represented in its free acid form by the formula:



(B)

wherein R is a hydrogen atom or a C_1–C_4 alkyl group, Y is a halogen atom, $-NHC_2H_4SO_3H$ or



and X is $-CH=CH_2$ or $-C_2H_4W$ wherein W is a group removable by action of alkali.

4,888,029

DESULFURIZATION OF CARBONACEOUS MATERIALS

Richard H. Shiley, Sidney; Randall E. Hughes, Champaign, both of Ill.; John R. Webster, Bloomington, Ind.; Conrad C. Hinckley, Carbondale, Ill.; Gerald V. Smith, Carbondale, Ill., and Tomasz Wiltowski, Carbondale, Ill., assignors to The Board of Trustees of Southern Illinois University, Carbondale and The Illinois State Geological Survey, Champaign, both of, Ill.

Filed Jun. 7, 1988, Ser. No. 203,272

Int. Cl.[4] C10L *5/00*; C10B *57/00*

U.S. Cl. 44—622 **17 Claims**

1. A process for desulfurizing carbonaceous material containing inorganic bound sulfur, organic bound sulfur, or a combination thereof comprising reacting the carbonaceous material at desulfurization conditions with a hydrogen source material comprising an alcohol, a hydrocarbon, an alicyclic compound, hydrogen, or a combination thereof in the presence of a flowing gas medium comprising a reaction accelerator comprising oxygen, nitric oxide, or a combination thereof to enhance production and reactivity of atomic hydrogen supplied by said hydrogen source.

3. The process of claim 1 wherein the carbonaceous material comprises coal, cokes, coal products, liquid crudes, or combinations thereof.

4. The process of claim 1 further comprising adding an optional catalyst comprising a layered graphite or clay material.

4,888,030

CREOSOTE REMOVAL COMPOSITION

William R. Meyer, RR #1 Box 7C, Sabula, Iowa 52070, and Calvin F. Dechow, RR #1, Box 112, Cassville, Wis. 53806

Filed Jul. 14, 1988, Ser. No. 219,380

Int. Cl.[4] C10L *10/00*

U.S. Cl. 44—640 **4 Claims**

1. A creosote removal composition comprising:

hydrated aluminum silicate amounting to between forty and eighty percent of the total mixture;

calcium hydroxide amounting to between one and forty percent of the overall mixture, and

sodium bicarbonate amounting to between one and twenty-five percent of the overall mixture.

4,888,031

PROCESS FOR PARTIAL OXIDATION OF A LIQUID OR SOLID AND/OR A GASEOUS HYDROCARBON-CONTAINING FUEL

Franciscus J. A. Martens, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 28, 1989, Ser. No. 344,587

Claims priority, application United Kingdom, May 26, 1988, 8812472; Sep. 30, 1988, 8822946

Int. Cl.[4] C10J *3/46*

U.S. Cl. 48—197 R **5 Claims**

1. A process for partial oxidation of a liquid or solid and/or a gaseous hydrocarbon-containing fuel which process comprises

supplying an oxygen-containing gas and hydrocarbon-containing fuel to a gasification zone through a concentric burner-arrangement of 4 concentric annular channels and one central channel, and producing auto-thermically a gaseous stream containing synthesis gas under appropriate conditions, and

further comprises supplying the oxygen-containing gas through the first and third channels of the concentric arrangement at a relatively high velocity of 50–150 m/sec;

supplying hydrocarbon-containing gas and/or moderator gas through the central channel and the fourth concentric channel encircling the central channel at a medium velocity of 5–84 m/sec; and

supplying liquid or solid hydrocarbon-containing fuel through the second concentric channel encircling the first concentric channel at a relatively low velocity of 0-15 m/sec, provided that the respective velocities are measured at the outlet of the said respective concentric channels into the gasification zone.

4,888,032

SALTS OF CATIONIC-METAL DRY CAVE COMPLEXES

Daryle H. Busch, Columbus, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio

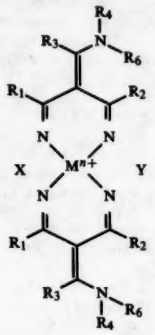
Continuation-in-part of Ser. No. 114,670, Jan. 23, 1980, abandoned. This application Jan. 18, 1984, Ser. No. 571,812

Int. Cl.[4] C01B *13/0, 21/04*; B01D *19/00, 53/34*

U.S. Cl. 55—38 **208 Claims**

1. A salt of a cationic metal complex of the formula:

XVII



wherein:

M is Co, Fe, Cu, or Mn;

n+ is a positive oxidation state of M, n being not greater than 3;

X and Y are each independently an o-phenylene, ethylene, trimethylene, 2-(2-pyridyl)-trimethylene, 2-methyl substituted trimethylene or 2-(N-methyl-2-pyridino)-trimethylene group;

each R_1 independently is hydrogen or a methyl group;

each R_2 independently is hydrogen or a methyl group;

each R_3 independently is hydrogen, an alkyl group containing not more than about 17 carbon atoms, a benzyl group, a phenyl group, or a phenyl group substituted by a halogen atom or by one or two methoxy groups; or the two R_3 groups together form a carbon-carbon bridge, said carbon-carbon bridge comprising a polymethylene bridge containing from 7 to about 12 carbon atoms or an m- or p-xylylene group;

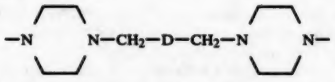
each R_4 independently is hydrogen, an alkyl group containing not more than about 4 carbon atoms, a cyanoalkyl group containing not more than about four carbon atoms, a phenyl group or a benzyl group;

each R_6 independently is hydrogen or a methyl group; or the two R_6 groups together form a nitrogen-nitrogen bridge, said nitrogen-nitrogen bridge comprising a polymethylene group containing from 4 to about 12 carbon atoms, a polymethylene group containing from 4 to about 12 carbon atoms and substituted by a methoxycarbonyl group, or a grouping of the formula:

$$-(CH_2)_a-G-(CH_2)_b-$$

where a and b are each independently 1, 2 or 3 and G is a 1,3-phenylene group, a 1,4-phenylene group, a methoxy-substituted 1,4-phenylene group, a 9,9-fluorylene group, a 1,3-cyclohexylene group, a 1,4-cyclohexylene group, a sulfur atom, an imino group, or a methylimino group, subject to the proviso that when G is a sulfur atom, a imino group or a methylimino group, the sum of a and b is at least 4;

or the two NR_4R_6 groups together form a bis-piperazino bridge of the formula



where D is a 1,3-phenylene group, a 1,4-phenylene group, a 1,4-phenylene group substituted by one or more methyl groups, a 9,10-anthracene group or a 2,6-pyridylene group,

subject to the proviso that when the two R_3 groups do not form a carbon-carbon bridge, either the two R_6 groups must form a nitrogen-nitrogen bridge or the two NR_4R_6 groups must form a bis-piperazino bridge.

4,888,033

METHOD OF MANUFACTURING PERMEABLE MINERAL MEMBRANES

Jean Charpin, Paris; André Grangeon, Valreas; Francis Pejot, Piolenc; Pierre Plurien, Palaiseau; Bernard Rasneur, Le Mesnil St-Denis; Serge Richard, Pont St-Esprit, and René Veyre, Montelimar, all of France, assignors to Commissariat A L'Energie Atomique, Paris, France

Continuation of Ser. No. 891,442, Mar. 20, 1978, abandoned. This application Feb. 8, 1980, Ser. No. 114,974

Claims priority, application France, Apr. 12, 1977, 77 10924

Int. Cl.[4] B01D *13/04, 59/14;* **B22F** *3/22, 3/16, 3/10*

U.S. Cl. 55—158 **20 Claims**

1. In a method of manufacturing a porous, permeable mineral membrane having a mean pore radius in the range of less than 200 Å and a permeability to nitrogen of 200 to $3000 \cdot 10^{-7}$ mol/cm $Hg/cm^2/min$, the steps of depositing a voidless thin layer of a sol of aluminium hydroxide by slip painting without compacting on a permeable porous substrate and drying and firing the resulting membrane at a temperature between 500° and 1100° C. selected to obtain the desired mean pore radius.

7. A porous, permeable mineral membrane having a mean pore radius lower than 60 Å as obtained by he method according to claim 1.

4,888,034

CHOKE DEVICE FOR INTERNAL COMBUSTION ENGINE

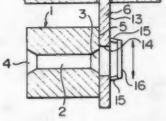
Hiroaki Koga, Fuchu, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Filed Jan. 11, 1989, Ser. No. 295,798

Claims priority, application Japan, Feb. 25, 1988, 63-23073[U]

Int. Cl.[4] F02M *19/00*

U.S. Cl. 55—260 **3 Claims**



1. A choke device for an internal combustion engine comprising: a choke plate formed with an opening capable of aligning with a suction port of a venturi of the carburetor of said engine and slidably supported for opening and closing said suction port; legs of a suitable length which rise outwardly from the periphery of said opening; and a blow-back prevention plate provided on the tip of said legs and extending in parallel with said choke plate, said legs and said blow-back prevention plate being provided on an outer surface of said choke plate in such a manner as to form an integral structure therewith.

4,888,035

PROCESS AND APPARATUS FOR SEPARATION OF A GASEOUS MIXTURE

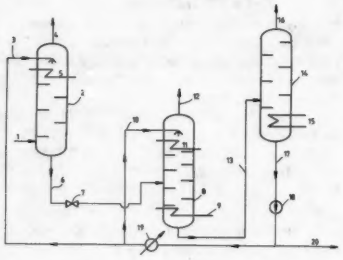
Heinz Bauer, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 274,562

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1987, 3739724

Int. Cl.[4] F25J 3/00

U.S. Cl. 62—20 17 Claims



1. In a process for separating a gaseous mixture containing essentially hydrogen, methane and carbon monoxide comprising:

(a) scrubbing said gaseous mixture in a physical low-temperature scrubbing step using liquid methane as the scrubbing medium

(b) separating H_2 and CO from loaded methane discharged from said scrubbing step (a) in a separation step, and

(c) thereafter regenerating said loaded methane in a regeneration step wherein said loaded methane is separated into enriched CO and CH_4 fractions, the improvement wherein

said H_2 and CO gas obtained during said separation step (b) is brought into contact with regenerated liquid methane to recover CO therefrom, resulting in an increased overall yield of CO.

4,888,036

METHOD OF MANUFACTURE OF GLASS BODIES

Rolf Clasen, Aachen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 15, 1988, Ser. No. 271,559

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739907

Int. Cl.[4] C03B 37/016

U.S. Cl. 65—18.1 21 Claims

1. A method of manufacturing glass bodies, in which a thixotropic suspension of SiO_2 particles having a diameter in the range from 10 to 500 nm in a dispersing liquid is formed into a green body, after which the green body thus formed is purified and sintered, the method comprising the steps of forming the suspension to have a solid: dispersing liquid weight ratio of from 1:1 to 1:1.5, passing the suspension through at least one sieve having an aperture size in the range from 3 to 300 μm, concentrating the sieved suspension until a solid: dispersing liquid weight ratio of about 1.3:1 is obtained, introducing the concentrated suspension into a mould, heating the mould to a temperature below the boiling point of the dispersing liquid to form a green body, cooling the green body and thereafter removing it from the mould and converting it to a glass body.

4,888,037

GLASS TO METAL SEALING PROCESS

Nikhiles Bandyopadhyay, Somerset; Satish S. Tamhankar, Scotch Plains, and Mark J. Kirschner, Morristown, all of N.J., assignors to The BOC Group, Inc., Murray Hill, N.J.

Continuation-in-part of Ser. No. 105,065, Oct. 5, 1987, abandoned. This application Aug. 8, 1988, Ser. No. 229,588

Int. Cl.[4] C03C 27/02

U.S. Cl. 65—32.2 12 Claims

1. A single-step process for fusing a glass to an untreated metal wherein the glass and the metal have similar coefficients of thermal expansion, said process consisting of:

heating the glass and the untreated metal in an atmosphere containing from about 1.0 to 1.5 volume percent of water vapor, from about 1.0 to 2.0 volume percent of hydrogen gas and the balance of an inert gas at a temperature of at least the melting point of the glass for a time sufficient to melt the glass and fuse the melted glass to untreated metal wherein said untreated metal is a metal which has not undergone decarburization nor oxidation.

4,888,038

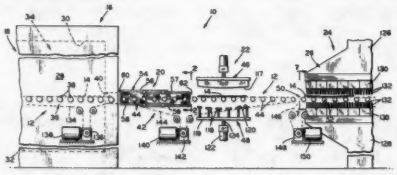
APPARATUS AND METHOD FOR TEMPERING GLASS SHEETS

Richard A. Herrington, Walbridge, Ohio; Jeffrey R. Flaugher, Carlton, Mich.; John W. Borer, Perrysburg, Ohio; Alan C. Woodward, Wigan, and Geoffrey Greenhalgh, Orrell, both of England, assignors to Libbey-Owens-Ford Co., Toledo, Ohio and Pilkington plc, St. Helens, England

Filed Feb. 12, 1988, Ser. No. 155,259

Int. Cl.[4] C03B 27/04

U.S. Cl. 65—114 23 Claims



17. A method of tempering a relatively thin glass sheet so that it exhibits improved fragmentation and reduced iridescence characteristics, comprising the steps of conveying the sheet through a heating area and heating the sheet to a temperature adequate for tempering, continuously advancing the heated sheet along a path through a chilling area and directing opposed streams of cooling fluid against the opposite major surfaces of the advancing sheet sequentially in first, second and third patterns as it advances through said chilling area, each said pattern extending entirely across said chilling area, said streams of said first pattern being uniformly distributed and arranged in a plurality of spaced, longitudinal first columns aligned along the direction of travel of said sheet and spaced, transverse first rows, said streams in adjacent ones of said first longitudinal columns being staggered relative to one another, said streams in said second pattern being arranged in a plurality of spaced, longitudinal second columns aligned along the direction of travel of said sheet and spaced, transverse second rows, said streams in adjacent ones of said second longitudinal columns being aligned transversely relative to one another, with said second columns being longitudinally aligned with alternate ones of said first columns, and said streams in said third pattern being uniformly distributed and arranged in a plurality of spaced, longitudinal third columns aligned along the direction of travel of said sheet and spaced, transverse third rows, said streams in adjacent ones of said third columns being staggered relative to one another.

20. Apparatus for tempering heated, relatively thin glass sheets by directing individual streams of cooling fluid against

the opposite major surfaces of said heated sheets comprising, heating means for heating the sheets to a temperature adequate for tempering, chilling means for rapidly cooling the heated sheets, and conveyor means for supporting and continuously conveying said sheets one after another through said heating and chilling means, said chilling means including a blast head positioned to direct cooling fluid against each of the opposite surfaces of said sheets as they advance through said chilling means, each said blasthead including first, second and third modules arranged serially and having tubes through which said cooling fluid is directed against said surfaces entirely across said sheets as said sheets are continuously conveyed therepast, the tubes of said first module being uniformly distributed and arranged in a pattern of spaced, longitudinal first columns aligned with said conveyor means and spaced, transverse first rows, the tubes in adjacent ones of said first longitudinal columns being staggered relative to one another, the tubes of said second module being arranged in a pattern of spaced, second longitudinal columns aligned with said conveyor means and spaced, transverse second rows, said tubes in adjacent ones of said second longitudinal columns being aligned transversely relative to one another, with said second columns being longitudinally aligned with alternate ones of said first columns, and the tubes of said third module being uniformly distributed and arranged in a pattern of spaced, longitudinal third columns aligned with said conveyor means and spaced, transverse third rows, said tubes in adjacent ones of said third columns being staggered relative to one another, whereby said sheets following passage through said chilling means exhibit improved fragmentation and reduced iridescence characteristics.

4,888,039

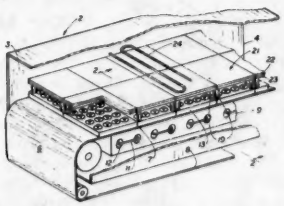
APPARATUS FOR MANUFACTURING HERMETIC TERMINAL ASSEMBLIES

Benjamin Bowsky, Warren County, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 732,704, May 10, 1985, Pat. No. 4,804,396. This application Nov. 18, 1988, Ser. No. 272,933

Int. Cl.[4] H01J *9/18*

U.S. Cl. 65—139 **11 Claims**



1. An apparatus for forming glass to metal hermetic seals in terminal assemblies of apertured housing parts having glass sleeved terminal pins extending in the apertures of said housing parts comprising: an enclosed chamber having an inlet end and an outlet end; an endless conveyor flight disposed to moveably pass within said chamber to carry housing parts thereon with the glass sleeved pins supportedly disposed in substantially vertical position for preselected residence periods; and heating means disposed within said chamber arranged to apply at least the major portion of a total heating gradient to be transmitted to said glass sleeved pins in an upwardly directed glass flowing heating gradient to said housing parts while disposed in said chamber to flow the glass sleeves of said pins in an upwardly direction from bottom to top to firmly fuse the terminal pins in said housing parts with minimal voids. elements extending above said endless conveyor flight along the length thereof to transmit a minor portion of said glass flowing heating gradient to the upper portion of said housing parts.

4,888,040

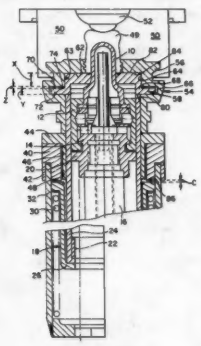
NECK RING/PLUNGER ASSEMBLY FOR A GLASSWARE FORMING MACHINE

Robert J. Douglas, North Granby, and Albert J. Trahan, Veron, both of Conn., assignors to Emhart Industries, Inc., Hartford, Conn.

Filed Mar. 28, 1989, Ser. No. 329,749

Int. Cl.[4] C08B *11/00*

U.S. Cl. 65—307 **2 Claims**



1. A neck ring/plunger assembly for a glassware forming machine comprising:

a neck ring assembly including a neck ring having a stepped interior groove having a top cylindrical portion with a top surface and a bottom enlarged cylindrical portion and a guide ring having an outer stepped annular portion including a top cylindrical portion to be received by said neck ring top cylindrical portion having a top surface and a bottom enlarged cylindrical portion to be received by said bottom enlarged cylindrical neck ring portion,

the height of said top cylindrical guide ring portion being selected to be larger than the height of the top cylindrical portion of said neck ring by an amount sufficient so that said top surfaces of said neck and guide rings can be maintained in engagement as the top surface of said guide ring wears, and

a plunger assembly including means for forcefully urging said guide ring top surface into engagement with said neck ring top surface, the difference between the height of said cylindrical neck and guide ring portions being selected so that the glassware forming machine can be operated for a prolonged period with said surfaces in engagement.

4,888,041

GRAIN SELECTIVE HERBICIDES

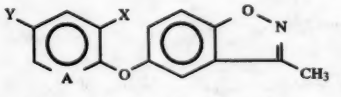
Lucinda A. Jackson, Pleasant Hill, and Sudarshan K. Malhotra, Walnut Creek, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 18, 1987, Ser. No. 51,442

Int. Cl.[4] A01N *43/80, 43/40*

U.S. Cl. 71—88 **9 Claims**

1. A method for selectively controlling weeds in the presence of a grain crop which comprises applying to the locus of the emerged crop a selectively effective amount of a compound of the formula



wherein

A represents CH or N;
X represents H, F, Cl, or Br; and
Y represents F, Cl, Br, CF_3, or CN.

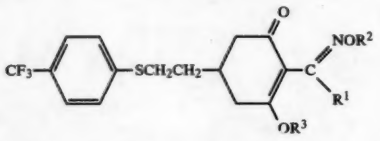
4,888,042

CYCLOHEXENONE DERIVATIVE, PROCESS FOR PRODUCING THE SAME AND HERBICIDES COMPRISING THE SAME AS ACTIVE INGREDIENT

Kenji Arai, Toyonaka; Kouichi Morita, Kasai; Nobuaki Mito, Takarazuka, and Naonori Hirata, Sakai, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 20, 1988, Ser. No. 208,600
Claims priority, application Japan, Jul. 3, 1987, 62-167639
Int. Cl.[4] A01N *43/00*
U.S. Cl. 71—88 **11 Claims**

1. A cyclohexenone derivative represented by the formula,



wherein R^1 represents a (C_1–C_3)alkyl group, R^2 represents a (C_1–C_3)alkyl, (C_3–C_4)alkenyl, propargyl or chloroallyl group, and R^3 represents a (C_1–C_{12})alkyl, (C_3–C_5)alkenyl, propargyl, halo(C_2–C_3)alkyl, halo(C_3–C_4)alkenyl, (C_3–C_6)cycloalkyl, (C_5–C_7)cycloalkenyl, (C_1–C_8)alkoxy(C_1–C_2)alkyl, methylthiomethyl, halo(C_2–C_4)alkoxymethyl, benzyloxymethyl (which may be substituted with a (C_1–C_2)alkyl group or halogen atom), carboxy(C_1–C_4)alkyl, (C_1–C_5)alkoxycarbonyl(C_1–C_4)alkyl, di(C_1–C_3)alkylcarbamoyl, di(C_1–C_3)alkylthiocarbamoyl, O,O-di(C_1–C_3)alkoxyphosphinyl, (C_1–C_{11})alkylcarbonyl, (C_2–C_4)alkenylcarbonyl, (C_3–C_6)cycloalkylcarbonyl, (C_3–C_6)cycloalkylacetyl, chrysanthemoyl, benzoyl (which may be substituted with a (C_1–C_2)alkyl group or halogen atom), naphthalenecarbonyl, pyridinecarbonyl, furoyl or thenoyl (which may be substituted with a (C_1–C_2)alkyl group or halogen atom).

8. A herbicidal composition which comprises as an active ingredient a herbicidally effective amount of the compound according to claim 1 and a carrier.

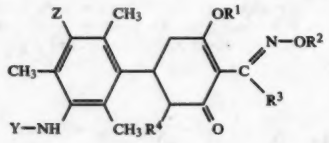
4,888,043

HERBICIDAL AMINO-MESITYL CYCLOHEXANE-1,3-DIONE COMPOUNDS

Keith G. Watson, and Craig G. Lovel, both of Melbourne, Australia, assignors to ICI Australia Limited, Melbourne, Australia

Filed Jun. 20, 1986, Ser. No. 876,748
Claims priority, application Australia, Jul. 12, 1985, PH1448; Jul. 26, 1985, PH1669
Int. Cl.[4] A01N *43/40, 37/22, 37/24;* C07D *333/24;* C07C *131/08, 119/06, 131/04, 131/10*
U.S. Cl. 71—88 **10 Claims**

1. A compound of formula I



I

wherein

Y is selected from the group consisting of:

C_1 to C_6 alkylsulfonyl; C_1 to C_6 haloalkylsulfonyl; C_2 to C_6 haloalkanoyl; R^5CO and R^5CS wherein R^5 is selected from the group consisting of: hydroxy, C_1 to C_6 alkoxy, amino, C_1 to C_6 alkylamino and di(C_1 to C_6 alkyl)amino;

Z is selected from the group consisting of hydrogen, halogen, C_1 to C_4 alkyl, C_2 to C_4 alkanoyl, sulfamoyl, C_1 to C_4 alkylsulfamoyl, di(C_1 to C_4 alkyl)sulfamoyl, carboxy and trifluoroacetylamino;

R^1 is selected from the group consisting of: hydrogen; C_2 to C_6 alkanoyl and the alkali metal cations;

R^2 is selected from the group consisting of: to C_6 alkyl; C_1 to C_6 haloalkyl; C_2 to C_6 alkenyl; C_2 to C_6 haloalkenyl and C_3 to C_6 alkynyl;

R^3 is selected from the group consisting of: C_1 to C_6 alkyl; and

R^4 is selected from the group consisting of: hydrogen; C_1 to C_6 alkyl; and (C_1 to C_6 alkoxy) carbonyl.

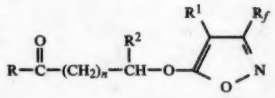
4,888,044

3-PERFLUOROALKYL-5-SUBSTITUTED-OXY-ISOXAZOLE DERIVATIVES, PROCESS FOR PREPARING THE SAME, AND HERBICIDES CONTAINING THE SAME

Shinzaburo Sumimoto, Ashiya; Ichiro Ishizuka, Toyono; Shiro Ueda, Osaka; Hiroyuki Kai, Koka, and Kinya Ide, Kusatsu, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Aug. 24, 1987, Ser. No. 88,214
Claims priority, application Japan, Aug. 25, 1986, 61-199578
Int. Cl.[4] A01N *43/74, 43/84;* C07D *261/12, 413/12*
U.S. Cl. 71—88 **3 Claims**

3. A herbicidal composition which comprises as an active ingredient, a herbicidally effective amount of a compound of the formula:



in which R is OH, C_1–C_3 alkoxy or R^3-N-R^4; R_f is C_1–C_3 perfluoroalkyl; R^1 is hydrogen, C_1–C_6 alkyl, phenyl or phenyl substituted by chloro, fluoro, methyl, methoxy, or methylenedioxy; R^2 is hydrogen or C_1–C_3 alkyl; n is an integer of 0 to 2; R^3 is hydrogen, or C_1–C_3 alkyl; R^4 is C_1–C_6 alkyl, benzyl, α-methylbenzyl, α,α-dimethylbenzyl, phenylethyl, phenylpropyl, phenyl or phenyl substituted with one or two substituents selected from the group consisting of halogen, C_1–C_4 alkyl, methoxy, methylthio, methylcarbonyl, trifluoromethyl, nitro and phenyl; or R^3 and R^4 together with the nitrogen atom to which they are attached form 2-methylpiperidino, 2-ethylpiperidino, morpholino or pyrrolidino; or a an agriculturally acceptable salt thereof.

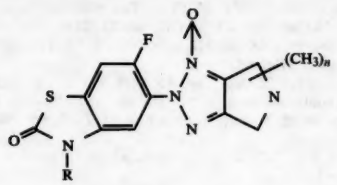
4,888,045

BENZOTHIAZOLONES, AND THEIR PRODUCTION AND USE

Masayuki Enomoto, Takarazuka; Eiki Nagano, Tokyo; Toru Haga, Takarazuka; Kouichi Morita, and Ryo Sato, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 11, 1987, Ser. No. 131,742
Claims priority, application Japan, Dec. 11, 1986, 61-296041
Int. Cl.[4] C07D *417/04;* A01N *43/78*
U.S. Cl. 71—90 **10 Claims**

1. A compound of the formula:



wherein R is a C_1–C_5 alkyl group, a C_3–C_4 alkenyl group, a C_3–C_4 alkynyl group, a C_1–C_2 alkoxy(C_1–C_2)alkyl group, a C_1–C_2 alkylthio(C_1–C_2)alkyl group or a mono- or polyfluoro-(C_1–C_3)alkyl group, X is a C_1–C_4 alkylene group which may be substituted with at least one methyl or a —OCH_2— group and n is an integer of 0, 1 or 2.

4,888,046

N-PHENYLTETRAHYDROPHTHALIMIDE COMPOUNDS

Lothar Rueb, Speyer; Karl Eicken, Wachenheim; Bernd Zeeh, Limburgerhof; Norbert Meyer, Ladenburg, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

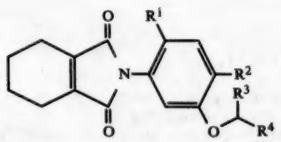
Filed Oct. 27, 1988, Ser. No. 263,352

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 3736297

Int. Cl.[4] A01N *43/38;* **C07D** *307/12, 333/16*

U.S. Cl. 71—90 **3 Claims**

1. An N-phenyltetrahydrophthalimide compound of the formula I



I

where R^1 is hydrogen, fluorine or chlorine, R^2 is chlorine or bromine, R^3 is hydrogen or C_1–C_3-alkyl, and R^4 is a 5- or 6-membered, saturated or unsaturated heterocyclic compound containing an oxygen or a sulfur atom and which is unsubstituted or substituted by a maximum of three C_1–C_3-alkyl groups.

3. A herbicidally effective agent containing a herbicidally effective amount of a compound I as set forth in claim **1** and conventional auxiliaries, extenders or diluents.

4,888,047

ACYLAMINOARYLOXY AND ARYLTHIO PYRIMIDINES AS HERBICIDES

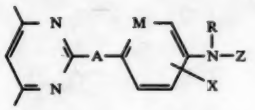
Pamela D. Milano, Concord, and Donald R. James, El Sobrante, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Continuation of Ser. No. 789,279, Oct. 18, 1985, abandoned. This application Apr. 1, 1988, Ser. No. 176,510

Int. Cl.[4] A01N *43/48;* **C07D** *239/02*

U.S. Cl. 71—92 **3 Claims**

1. A pyrimidine having the formula

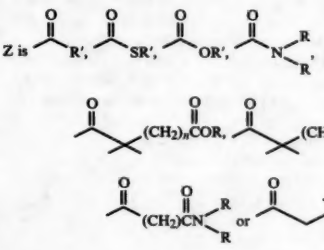


wherein

A is oxygen or sulfur;

M is N;

X is hydrogen, lower alkyl, halo, methoxy, alkoxy, C_1–C_3 alkylthio, cyano, carbomethoxy or trifluoromethyl;



R′ is C_1–C_8 straight, branched-chain or halo-alkyl, phenyl or halophenyl; and

R is hydrogen, C_1–C_8 straight or branched chain alkyl, C_5 or C_6 cycloalkyl or phenyl or halophenyl; and n is zero to two.

4,888,048

FUNGICIDAL AND PLANT GROWTH-REGULATING AZOLYL-TETRAHYDROPYRAN DERIVATIVES

Klaus Stroech, Solingen; Monika Frie, Odenthal; Klaus Böckmann, Wuppertal; Klaus Lürssen, Bergisch-Gladbach, and Stefan Dutzmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

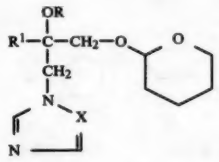
Filed Jun. 30, 1988, Ser. No. 213,877

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 3722133

Int. Cl.[4] C07D *405/12, 249/12;* **A01N** *43/653, 43/50*

U.S. Cl. 71—92 **11 Claims**

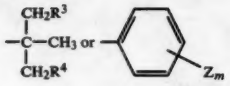
1. An azolyl-tetrahydropyran derivative of the formula



in which

R represents hydrogen, alkyl with 1 to 6 carbon atoms or alkylcarbonyl with 1 to 6 carbon atoms in the alkyl group,

R^1 represents straight-chain or branched alkyl with 1 to 6 carbon atoms, or represents cycloalkyl which has 3 to 8 carbon atoms in the cycloalkyl part and is optionally substituted by 1 to 3 identical or different substituents from the group consisting of alkyl with 1 to 4 carbon atoms and halogen, or represents the grouping



wherein

R^3 represents hydrogen, halogen or alkoxy with 1 to 4 carbon atoms,

R^4 represents halogen or alkoxy with 1 to 4 carbon atoms,

Z represents halogen, alkyl; with I to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms, alkylthio with 1 to 4 carbon atoms, halogenoalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms, halogenoalkoxy with 1 to 2 carbon atoms and 1 to 5 halogen atoms, halogenoalkylthio with 1 or 2 carbon atoms and 1 to 5 halogen atoms, or phenyl which is optionally substituted by alkyl with 1 or 2 carbon atoms and/or halogen, or represents phenoxy which is optionally substituted by alkyl with 1 of 2 carbon atoms and/or halogen and

m represents the number 0, 1, 2 or 3, and

x represents nitrogen or a CH group,

or an addition product thereof with an acid or metal salt.

4,888,049

SYNERGIST FOR BIOCIDE

Tetsuji Iwasaki, and Hitoshi Hosokawa, both of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan

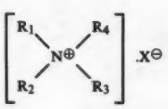
Filed May 29, 1987, Ser. No. 56,555

Claims priority, application Japan, Jun. 27, 1986, 61-151186

Int. Cl.[4] A01N *43/40*

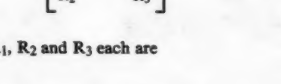
U.S. Cl. 71—94 **10 Claims**

1. A biocide composition which comprises a biocide and a branched quaternary ammonium salt having the formula (I):

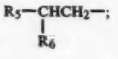


(I)

in which R_1, R_2 and R_3 each are



or an alkyl having 1 to 4 carbon atoms, Y being hydrogen or a halogen, R_5 being an alkyl or alkenyl having 4 to 18 carbon atoms, R_6 being an alkyl or alkenyl having 2 to 16 carbon atoms, at least one of R_1, R_2 and R_3 being



R_4 is an alkyl having 1 to 4 carbon atoms or $—CH_2CH_2OH$ and $X^{\ominus}$ is a counter ion.

4,888,050

FLUOROPHENOXY COMPOUNDS, HERBICIDAL COMPOSITIONS AND METHODS

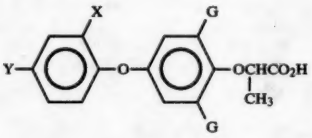
Richard B. Rogers, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 787,824, Oct. 15, 1985, Pat. No. 4,750,931, which is a continuation-in-part of Ser. No. 550,328, Nov. 10, 1983, abandoned. This application Feb. 11, 1988, Ser. No. 154,821

Int. Cl.[4] C07C *69/635, 71/00*; A01N *37/10*

U.S. Cl. 71—108 **14 Claims**

1. An acid compound of the formula



wherein

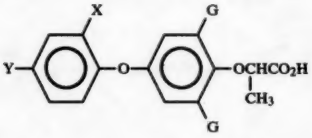
X represents Cl or F;

Y represents Cl, Br, I, CF_3, CF_2H, or $CClF_2$; and

each G independently represents H or F with the proviso that at least one G represents F;

or an agriculturally acceptable salt or ester thereof.

12. A method of killing and/or controlling undesired grassy plants which comprises providing in said grassy plants a herbicidally effective amount of an acid compound having the formula



wherein

X represents Cl or F;

Y represents Cl, Br, I, CF_3, CF_2H, or $CClF_2$; and

each G independently represents H or F with the proviso that at least one G represents F;

or an agriculturally acceptable salt or ester thereof; or a compound containing, in place of the $—CO_2H$ moiety, an organic moiety containing N, O, or S atoms which is or can be hydrolyzed and/or oxidized in plants or soil to an acid compound of said formula in undissociated and/or dissociated form.

4,888,051

METHOD FOR THE ZONE REFINING OF GALLIUM

Alan B. I. Bollong; Roelof P. Bult, both of Fruitvale, and Gary T. Proux, Trail, all of Canada, assignors to Cominco Ltd., Vancouver, Canada

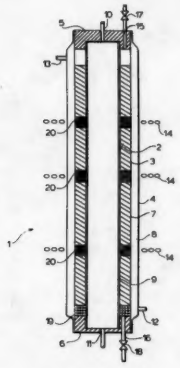
Filed Aug. 19, 1988, Ser. No. 233,710

Int. Cl.[4] C22B *58/00*

U.S. Cl. 75—10.11 **19 Claims**

1. A method for the zone refining of gallium comprising enclosing a charge of impure gallium having a head portion and a tail portion if a first annulus of a stationary, vertical, double annulus refiner, said first annulus being defined by an inner cylindrical wall and an outer cylindrical wall made of a material that does not impart impurities to the charge of gallium, said outer cylindrical wall being made of a flexible material; applying a flow of a suitable cooking fluid at a predetermined constant temperature to a second annulus of said refiner to effect cooling, said second annulus being defined by an exterior cylindrical wall enveloping said first annulus; positioning at least one annular radio frequency induction heating coil around said second annulus and narrowly spaced therefrom,

said coil being reciprocally movable along the height of said refiner; applying radio frequency waves form said coil to said charge of gallium to effect heating and to form at least one zone of molten gallium in said charge; moving said molten



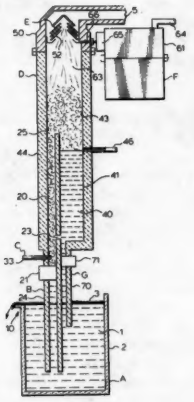
zone through the charge of gallium in one direction by reciprocately moving said coil for a required number of passes whereby impurities in the impure gallium segregate and collect in the tail portion, the heats position or both of said charge; and recovering zone refined gallium form said first annulus.

4,888,052

PRODUCING VOLATILE METALS

Ralph Harris, 372 Dulwich Ave., St. Lambert, Quebec, Canada J4P 2Z2; James Toguri, 3558 Golden Orchard Drive, Mississauga, Ontario, Canada, and Albert Wraith, Albion House, Warkworth, Northumberland, England

Filed Jun. 2, 1988, Ser. No. 201,446
Claims priority, application Canada, Jun. 8, 1987, 539058
Int. Cl.[4] C22B *26/12*
U.S. Cl. 75—20 R **44 Claims**



1. A method of recovering a value metal belonging to Group IA or Group IIA of the Periodic Table from a source material comprising an ore or concentrate of the value metal, comprising:

mixing the source material, in finely divided form, with an excess of a molten reaction metal reactable with said source material, under agitation, to rapidly wet said source material with said molten reaction metal,

allowing said molten reaction metal to react with said source material to form a molten mixture of an alloy of said value metal and said reaction metal and a dispersate of partially depleted source material in said excess of molten reaction metal,

subjecting the alloy to vacuum to separate the value metal therefrom as a vapour,

condensing the separated vapour and recovering the value metal.

4,888,053

CHLORIDE LEACHING OF IRON-BASED, HEAVY METAL-CONTAINING SLUDGES

Gerard Grayson, Irvine, and Morton M. Wong, Placentia, both of Calif., assignors to Union Oil Co. of California, Brea, Calif.

Filed Jul. 7, 1988, Ser. No. 216,158
Int. Cl.[4] C02F *11/00*
U.S. Cl. 75—101 R **114 Claims**

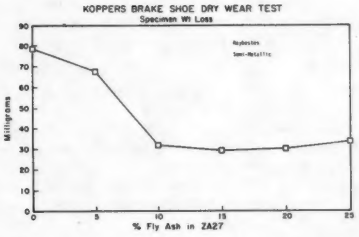
1. A method for removing heavy metals from an iron-based sludge comprising the steps of leaching the sludge with a first aqueous leaching solution, said solution comprising a non-acidic chloride, separating the first leaching solution from said sludge, leaching the separated sludge with a second aqueous leaching solution comprising a dissolved acidic metal chloride, and separating the second leaching solution from said sludge, both of said leaching steps being performed to displace and remove the heavy metals from said sludge with a minimum loss of iron therein.

4,888,054

METAL COMPOSITES WITH FLY ASH INCORPORATED THEREIN AND A PROCESS FOR PRODUCING THE SAME

Robert B. Pond, Sr., P.O. Box 331, Westminster, Md. 21157

Continuation-in-part of Ser. No. 17,677, Feb. 24, 1987, abandoned. This application Jan. 21, 1988, Ser. No. 147,359
Int. Cl.[4] C22C *29/12*
U.S. Cl. 75—234 **21 Claims**



1. A process for producing a metal composite from a low-cost earth product, comprising the steps of

(a) mixing a metal matrix material with fly ash to obtain a homogeneous mixture;

(b) heating said homogeneous mixture; and

(c) forming said homogeneous mixture, thereby creating bonds between said fly ash and said metal matrix material to produce a metal composite.

4,888,055

USE OF AN AGENT FOR PRODUCTION OF A CONSTANT COATING THICKNESS DURING CATHODIC ELECTROCOATING

Gerd Walz, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst AG, Fed. Rep. of Germany

Filed Aug. 27, 1986, Ser. No. 901,184

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530843

Int. Cl.[4] B05B *7/00*

U.S. Cl. 106—1.05 **7 Claims**

1. An aqueous coating composition for cathodic electrocoating containing a synthetic resin, a hardener and conventional additives, the improvement comprising as an additional component acting as a coating thickness regulator, a reaction product of primary monoamines of the formula $R\text{-}NH_2$ where R is selected from the group consisting of alkyl and alkoxy of 2 to 18 carbon atoms, cycloaliphatic of up to 10 carbon atoms and araliphatic of up to 10 carbon atoms and cyclic monocarbonates in the molar ratio of 1:0.8 to 0.8:1, wherein the monocarbonate is an alkylene carbonate having 2 to 18 carbon atoms in the alkylene group or is one which has been prepared from compounds which contain a substituted or non-substituted glycidyl ester or glycidyl ether group.

4,888,056

SHOP PRIMER COMPOSITIONS

Cornelis E. M. van der Kolk, Heemskerk; Hendrik Van der Poel, Amstelveen, both of Netherlands, and Jozef Braeken, Denderleeuw, Belgium, assignors to Labofina, S.A., Feluy, Belgium

Filed Feb. 16, 1988, Ser. No. 156,261

Claims priority, application PCT Int'l Appl., Feb. 13, 1987, PCT/BE87/00001

Int. Cl.[4] C09D *5/10*

U.S. Cl. 106—1.17 **6 Claims**

1. A method for preparing a shop primer composition comprising and a

(a) mixing in a vessel finely divided zinc conductive pigment/filler additive, at least 25 wt. % thereof having conductive properties, selected from the group consisting of conductive fillers, conductive pigments, non conductive fillers, non conductive pigments and mixtures thereof, in a weight ratio of zinc to pigment/filler between about 1:16 and 1:1; and

(b) milling the mixture of (a) to a sufficient fineness to improve the anti-corrosive properties and lower the spattering properties of the shop primer composition;

wherein the resulting composition also contains at least one anti-settling agent, at least one solvent, and a silicate binder in an amount such that the weight ratio of SiO_2 in said binder to the zinc and pigment/filler additive is between 1:4 and 1:16.

4,888,057

INORGANIC INTUMESCENT FIRE PROTECTIVE COATINGS

Dat T. Nguyen, Mississauga; Dwight E. Veinot, Halifax, and James Foster, Mississauga, all of Canada, assignors to Her Majesty the Queen as represented by the Minister of National Defence of Her Majesty's Canadian Government, Canada

Filed Jun. 29, 1988, Ser. No. 213,116

Int. Cl.[4] C09D *5/18*

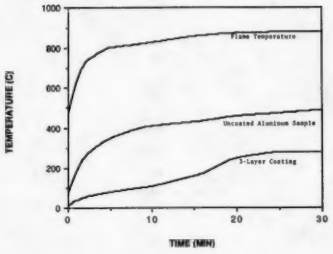
U.S. Cl. 106—18.12 **28 Claims**

1. A fire-resistant inorganic intumescent coating composition which intumesces when subjected to high temperatures to form a substantially continuous heat insulating structure comprising

	Parts by Weight
Sodium Silicate	40–70
Potassium Silicate	40–70

-continued

	Parts by Weight
Silicon carbide powder	03–15



wherein the amounts of the ingredients are expressed as parts by weight, based upon the weight of the composition.

4,888,058

SILICA FUME SLURRY

Arnold M. Rosenberg, Potomac; James M. Gaidis, Ellicott City, and Lawrence J. Kindt, Woodbine, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Sep. 29, 1986, Ser. No. 912,018

Int. Cl.[4] C04B *14/04, 22/16, 24/06*

U.S. Cl. 106—98 **12 Claims**

1. A composition consisting essentially of an aqueous slurry containing from 45–65 weight percent silica fume obtained from 70 to 80 percent ferrosilicon metal alloy production and from 0.25 to 1 percent of a stabilizing agent selected from a tripolyphosphate, citric acid, the sodium or potassium salts of said acids and mixtures thereof.

4,888,059

CEMENT DISPERSING AGENT

Kouichi Yamaguchi, Izumi-ohtsu, and Tokio Goto, Takaishi, both of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Dec. 22, 1987, Ser. No. 136,344

Claims priority, application Japan, Dec. 25, 1986, 61-307983

Int. Cl.[4] C04B *24/04*

U.S. Cl. 106—314 **10 Claims**

1. A cement dispersing agent consisting essentially of a copolymer obtained by copolymerizing a reaction mixture consisting essentially of (a) 40 to 90% by weight, calculated as an alpha,beta-ethylenically unsaturated monocarboxylic acid, of at least one compound selected from the group consisting of an alpha,beta-ethylenically unsaturated monocarboxylic acid and a salt of the alpha,beta-ethylenically unsaturated monocarboxylic acid and (b) 60 to 10% by weigh of at least one compound selected from the group consisting of an acrylic ester of a monohydric alkyl alcohol having 1 to 4 carbon atoms and a methacrylic ester of a monohydric alkyl alcohol having 1 to 4 carbon atoms, or a copolymer obtained by copolymerizing a reaction mixture consisting essentially of (a) 44 to 89% by weight, calculated as an alpha,beta-ethylenically unsaturated monocarboxylic acid, of at least one compound selected from the group consisting of an alpha,beta-ethylenically unsaturated monocarboxylic acid and a salt of the alpha,beta-ethylenically unsaturated monocarboxylic acid, (b) 51 to 10% by weight of at least one compound selected from the group consisting of an acrylic ester of a monohydric alkyl alcohol having 1 to 4 carbon atoms and a methacrylic ester of a monohydric alkyl alcohol having 1 to 4 carbon atoms and (c) 1 to 5% by weight of a copolymerizable unsaturated monomer.

4,888,060

ENRICHMENT OF FRUCTOSE SYRUPS

Carl W. Niekamp, Forsyth, and Martin Seidman, Decatur, both of Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Continuation-in-part of Ser. No. 747,622, Jun. 21, 1985, abandoned. This application Feb. 3, 1987, Ser. No. 11,417

Int. Cl.[4] C13F *1/02*

U.S. Cl. 127—60 22 Claims

1. A process for manufacturing an enriched fructose syrup comprising the steps of:

(a) providing a fructose containing feed syrup having a dry solids content between about 75 and 89 percent, the dry solids of said feed syrup comprising at least 94 percent monosaccharides on a dry solids basis and said monosaccharides being primarily composed of dextrose and fructose;

(b) establishing a feed syrup temperature of from about 15° C. to about 55° C.;

(c) seeding said feed syrup with a dextrose seed crystal;

(d) allowing said feed syrup to crystallize for at least about 8 hours at a crystallization temperature of from about 15° C. to about 55° C. to form a massecuite comprising dextrose crystals and mother liquor;

(e) adding an alcohol to, and mixing the alcohol with, said massecuite in an amount sufficient to enhance separation of said crystals, said alcohol comprising up to about 30 percent water by weight of said alcohol;

(f) separating said dextrose crystals from said mother liquor to yield a crystalline product; and

(g) removing said alcohol from said mother liquor to yield an enriched fructose syrup in which the fructose content has been increased by at least 10 percent relative to the original fructose content of the initial fructose containing feed syrup.

4,888,061

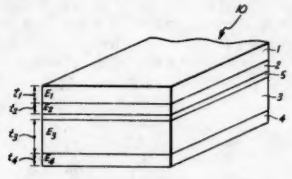
THIN-FILM SOLAR CELLS RESISTANT TO DAMAGE DURING FLEXION

Robert P. Wenz, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 1, 1988, Ser. No. 239,513

Int. Cl.[4] H01L *31/04, 31/18*

U.S. Cl. 136—251 22 Claims



19. A strip of solar cell tape including:

a flexible polymeric substrate having a thickness and characterized by an elastic modulus;

a thin-film photovoltaic device on the substrate;

a layer of encapsulant having a thickness and characterized by an elastic modulus encapsulating the photovoltaic device; and

a layer of adhesive having a thickness and characterized by an elastic modulus on the substrate opposite the photovoltaic device, wherein a neutral plane of the solar cell tape characterized by the thicknesses and elastic moduli of the substrate, layer of encapsulant and layer of adhesive is located near the photovoltaic device to prevent damaging stress on the photovoltaic device when the solar cell tape is flexed.

4,888,062

PIN JUNCTION PHOTOVOLTAIC ELEMENT HAVING I-TYPE SEMICONDUCTOR LAYER COMPRISING NON-SINGLE CRYSTAL MATERIAL CONTAINING AT LEAST ZN, SE AND H IN AN AMOUNT OF 1 TO 4 ATOMIC %

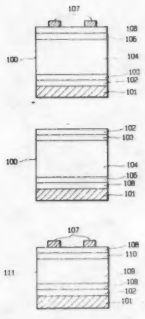
Katsumi Nakagawa, Nagahama; Masahiro Kanai, Tokyo; Shunichi Ishihara; Kozo Arao, both of Hikone; Yasushi Fujioka, Nagahama; Akira Sakai, Nagahama, and Tsutomu Murakami, Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 236,792

Claims priority, application Japan, Aug. 31, 1987, 62-217492; Oct. 5, 1987, 62-249856

Int. Cl.[4] H01L *31/06*

U.S. Cl. 136—258 8 Claims



1. An improved pin junction photovoltaic element which generates photoelectromotive force upon irradiation of light, having a junction of a p-type semiconductor layer, an i-type semiconductor layer and an n-type semiconductor layer, characterized in that at least said i-type semiconductor layer comprises a deposited film comprised of zinc atoms, selenium atoms and hydrogen atoms, said deposited film containing said hydrogen atoms in an amount of 1 to 4 atomic % and crystal grain domains in a proportion of 65 to 85 vol % per unit volume.

4,888,063

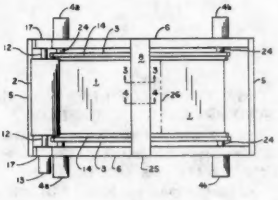
VARIABLE APERTURE, VARIABLE FLUX DENSITY, AEROSPACE SOLAR COLLECTOR

Roger A. Powell, 740 Jefferson St., Red Hill, Pa. 18076

Continuation of Ser. No. 800,219, Nov. 21, 1985, Pat. No. 4,719,903. This application Jan. 5, 1988, Ser. No. 140,828

Int. Cl.[4] H02N *6/00;* H01L *31/18*

U.S. Cl. 136—259 9 Claims



5. A solar collector for use in space, comprising:

a curved reflector which redirects incoming solar energy to a focus location,

a photovoltaic cell, positioned in proximity to said focus

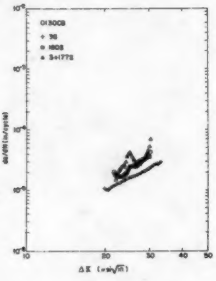
location, said cell intercepting said energy, said intercepted energy having a flux density and an effective area, means for remotely increasing said flux density and decreasing said effective area, thereby producing localized heating in said effective area.

4,888,064

METHOD OF FORMING STRONG FATIGUE CRACK RESISTANT NICKEL BASE SUPERALLOY AND PRODUCT FORMED

Keh-Minn Chang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 15, 1986, Ser. No. 907,276
Int. Cl.[4] C22F *1/10*
U.S. Cl. 148—2 **13 Claims**



6. The method of preparing a nickel base superalloy which comprises preparing a melt consisting essentially of the following approximate ingredient content

Element	Composition in weight % From	To
Ni	balance	
Cr	13	18
Co	15	20
Mo	3	6
W	3	6
Al	2	4
Ti	2	4
Nb	2	4
Zr	0.02	0.08
B	0.005	0.03
C	less than 0.1.	

cooling the melt to a solid,
supersolvus annealing the solid, and
cooling the solid at a rate of 250° C./min. or less.

11. The method of claim **6** in which the alloy is forged after cooling from the melt.

4,888,065

METHOD OF MAKING ROLLER BEARING ELEMENT AND PRODUCT THEREFROM

Karl-Ludwig Grell, Aurachtal, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed Sep. 11, 1986, Ser. No. 906,365
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1985, 3537658
Int. Cl.[4] C21D *1/74*
U.S. Cl. 148—16.5 **9 Claims**

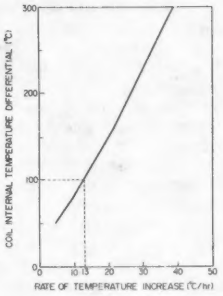
1. A method of producing a hardened rolling bearing element by carburizing the near-surface material at high temperatures and subsequent cooling, characterized in that the rolling bearing element is made from a non-magnetizable austenitic material and then carburized in an oxygen-free atmosphere.

4,888,066

METHOD FOR PRODUCING GRAIN-ORIENTED ELECTRICAL STEEL SHEET WITH VERY HIGH MAGNETIC FLUX DENSITY

Yasunari Yoshitomi; Kenzo Iwayama; Takeo Nagashima, and Kenichi Yakashiro, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,828
Claims priority, application Japan, Sep. 18, 1987, 62-232356
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—113 **5 Claims**



1. A method of manufacturing grain-oriented electrical steel sheet having very high magnetic flux density using an inhibitor having AlN as a main ingredient, comprising: a process of decarburization annealing of sheet cold-rolled to a final thickness and a final finish-annealing process following an application of an annealing separating agent; wherein the final finish-annealing takes place in an annealing atmosphere containing N_2 and thereby N_2 partial pressure, with the N_2 partial pressure in the annealing atmosphere being increased at an intermediate stage between start and completion of secondary recrystallization, and a temperature differential in a coil of the sheet between a highest temperature site and a lowest temperature site is controlled to keep it within 100° C. during changes in annealing atmosphere.

4,888,067

PROCESS FOR PRODUCING FLUX FOR BRAZING

Shoichi Sato; Yasuhiro Osame, and Seiji Tazaki, all of Oyama, Japan, assignors to Showa Aluminum Corporation, Sakai, Japan

Filed Jun. 7, 1988, Ser. No. 203,193
Claims priority, application Japan, Jun. 10, 1987, 62-144835
Int. Cl.[4] B23K *35/34*
U.S. Cl. 148—26 **3 Claims**

1. A process for producing a flux for brazing comprising preparing 31.5% to 56.2% of KF and 68.5% to 43.8% of at least one of γ-AlF_3 and β-AlF_3, dissolving the KF in water to form a soluton, reacting the KF solution with the AlF_3 by adding the AlF_3 with stirring to the solution, continuously stirring the solution for 10 to 20 minutes and drying the reaction product at 100° to 550° C.

4,888,068

PROCESS FOR MANUFACTURING PERMANENT MAGNET

Masaaki Tokunaga; Minoru Endoh; Noriaki Meguro, and Shigeho Tanigawa, all of Saitama, Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Oct. 4, 1985, Ser. No. 784,581
Claims priority, application Japan, Oct. 5, 1984, 59-209524
Int. Cl.[4] H01F *1/02*
U.S. Cl. 148—104 3 Claims

1. A process for manufacturing a sintered body of a permanent magnet having an alloy composition represented by the general formula

$$R(Fe_{1-x-y}Co_xB_y)z$$

wherein R represents Nd and/or Pr which may be partially substituted by one or more other rare earth elements, $0 \leqq x \leqq 0.5$, $0.02 \leqq y \leqq 0.3$ and $4 \leqq z \leqq 7.5$, which comprises the steps of:

(a) maintaining a sintered alloy body at temperatures of 750°–1000° C. for 0.2—5 hours after sintering;

(b) cooling said sintered alloy body slowly at a cooling rate of 0.6°–2.0° C./min. to temperatures between room temperature and 600° C.;

(c) annealing said sintered alloy boby at temperatures of 550°–700° C. for 0.2–3 hours; and

(d) cooling said sintered alloy body rapidly at a cooling rate of 20°–400° C./min.

4,888,069

NICKEL BASE SUPERALLOYS HAVING LOW CHROMIUM AND COBALT CONTENTS

David N. Duhl, Newington, and Stephen Chin, Wallingford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 1, 1985, Ser. No. 794,024
Int. Cl.[4] C22C *19/03*
U.S. Cl. 148—404 6 Claims

1. A heat treated single crystal nickel base superalloy article, consisting essentially of, by weight percent, 4.5–5.5 Al, 3.5–6.5 Re, 13–17 Ta, up to 0.5 Hf, up to 1 Cr, up to 0.2 Ti, up to 1 W, up to 0.2 Mo, up to 0.01 B, up to 0.01 Zr, up to 0.2 Cb, up to 0.05 C, with the balance Ni.

4,888,070

ENVIRONMENTAL SEALING OF A SUBSTRATE

Brian Clark, Sunnyvale; William D. Uken, Fremont; Paul Schoenstein, Redwood City, and Geary Camin, Los Altos, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

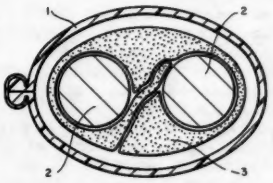
Filed Dec. 1, 1987, Ser. No. 127,342
Int. Cl.[4] H01B *13/06*
U.S. Cl. 156—48 13 Claims

1. A method of environmentally protecting a substrate which comprises:

(a) providing an envelope containing a sealing material having as ultimate elongation according to ASTM D638-80 of at least 100% and a cone penetration according to ASTM D217-68 at 21° C. of greater than 100 (10^{-1} mm);

(b) deforming at least a part of the envelope thereby causing the envelope and the material contained therein to conform to the substrate; and

(c) optionally subjecting the material to a shear force greater than its cohesive strength.



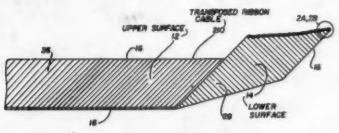
12. A method according to claim 1, in which the substrate comprises an electrical terminal or wire splice.

4,888,071

METHOD FOR MANUFACTURING RIBBON CABLE AND TRANSPOSED CABLE

John C. Kauffman, and Richard A. Westenfeld, both of Fort Wayne, Ind., assignors to Phelps Dodge Industries, Inc., New York, N.Y.

Division of Ser. No. 634,041, Jul. 24, 1984, Pat. No. 4,650,924.
This application Jul. 28, 1986, Ser. No. 890,099
Int. Cl.[4] H01B *13/06*
U.S. Cl. 156—50 32 Claims



1. A method of making ribbon cable comprising the steps of: providing one or more elongated conductors, superimposing on each of said conductors a relatively thin, flexible and generally continuous and concentric coating of insulating material, wrapping each of said conductors obliquely around an elongated mandrel of sheet material having opposed spaced apart edges and generally flat and parallel surfaces to form each conductor into a helix, said conductors defining an angle with the axis of said mandrel, compressing said helices together axially of said mandrel, said helices being side by side, flattening said helices transversely of said mandrel axis and generally perpendicularly of said mandrel surfaces, bonding said helices together in the compressed and flattened state thereof, thereby forming an integral ribbon of juxtaposed laterally flattened helices, and severing said ribbon at opposite ends transversely of said mandrel axis thereby to expose a plurality of conductor ends.

4,888,072

ACCESSORY SUPPORT DEVICE FOR VEHICLE WINDSHIELD AND METHOD OF INSTALLING

Hans Ohlenforst, Aachen, and Heinz Kunert, Cologne, both of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Sep. 8, 1988, Ser. No. 241,632
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730346
Int. Cl.[4] B60J *1/02*
U.S. Cl. 156—108 20 Claims

20. A method for detachably installing a vehicle accessory support panel within a passenger compartment of a motor vehicle, said method comprising:

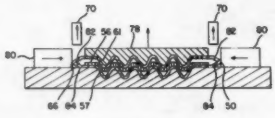
(a) preparing a shaped sheet of laminated safety glass, said glass sheet adapted for installation on a body portion of said vehicle, and extending at least partially within said passenger compartment;
(b) coating at least a peripheral portion of said glass sheet with an opaque material, said opaque material comprising at least one layer of a colored enamel;
(c) placing at least one discrete deposit of an adhesive compound upon said enamel coating along an upper peripheral portion of said glass sheet;
(d) pressing bracket means into each said deposit of adhesive compound such that at least a portion of said adhesive compound extrudes through at least one aperture defined by said bracket means to facilitate attachment between said bracket means and said glass sheet;
(e) removably mounting said accessory support panel upon said glass sheet by said bracket means;
(f) installing said glass sheet having said support panel mounted thereupon into frame means defined by said motor vehicle body portion; and
(g) connecting one or more vehicle accessory means located upon said panel to corresponding actuation means located within said passenger compartment to permit the operation of said accessory means.

4,888,073

EVACUATED INSULATION AND A METHOD OF MANUFACTURING SAME

Franz J. Kugelmann, Juneau, Ak., assignor to Nudvuck Enterprises, Juneau, Ak.

Division of Ser. No. 137,964, Dec. 23, 1987, Pat. No. 4,837,388. This application Jan. 9, 1989, Ser. No. 295,580
Int. Cl.[4] B32B *31/14*
U.S. Cl. 156—197 **5 Claims**



1. A method for manufacturing an insulation article, comprising the steps of:
positioning an elongated interior element which is flat and relatively thin and comprised of a flexible, resilient material, on the upper surface of one half of a sheet member having adjacent halves which define upper, and lower portions of the completed article, the sheet member comprised of a rigid but deformable material;
securing the interior element to said one half of the sheet member at spaced points along the lower surface of the interior element;
folding the other half of the sheet member, which defines the upper portion of the insulation article, on top of the one half thereof, which defines the lower portion of the insulation article;
securing, the interior element to the other half of the sheet member at spaced points along the upper surface of the interior element;
applying pressure to the top surface of the upper portion of the insulation article so as to force out substantially all of the gas between the upper and lower portions thereof;
sealing the periphery of the upper and lower portions so as to form an air-tight article of insulation;
deforming the combination of the upper and lower portions and the interior element so that the combination thereof is formed into a series of successive peaks and valleys;
expanding the upper and lower portions away from each other such that the interior element is substantially flat and the upper and lower portions are spaced apart from each other, wherein the interior space between the upper and lower portions is substantially completely evacuated.

4,888,074

THERAPEUTIC RINGS

David Pocknell, Antibes, France, assignor to Dow Corning France S.A., Valbonne, France

Filed Jul. 21, 1988, Ser. No. 222,441
Claims priority, application France, Jul. 22, 1987, 87 10363
Int. Cl.[4] B29C *47/06, 53/62;* B32B *25/20, 31/18*
U.S. Cl. 156—217 **12 Claims**

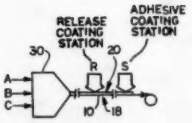
1. A method of making a ring capable of the controlled release of a therapeutic agent in a body comprising the following steps namely:
(i) extruding a first composition comprising a therapeutic agent and a first elastomer-forming silicone composition to provide a core;
(ii) extruding a second composition comprising a second elastomer-forming silicone composition to provide a sheath enclosing the core;
(iii) bringing together end portions of a piece of extruded core and sheath to form a ring,
(iv) effecting crosslinking of the extruded core, and
(v) effecting crosslinking of the extruded sheath.

4,888,075

COMPOSITE FACESTOCKS AND LINERS

Melvin S. Freedman, Beachwood, Ohio, assignor to Avery International Corporation, Pasadena, Calif.

Division of Ser. No. 853,772, Apr. 18, 1986, Pat. No. 4,713,273, which is a continuation-in-part of Ser. No. 699,204, Feb. 5, 1985, abandoned. This application Aug. 24, 1987, Ser. No. 88,402
Int. Cl.[4] B29C *47/06*
U.S. Cl. 156—243 **19 Claims**



1. A method of economically manufacturing roll or sheet facestock for labels, tapes, or signs, comprising the steps of providing a plurality of at least two charges of film-forming resin, coextruding said charges to thereby form a construction in the form of a multilayer extrudate comprising a relatively thick core layer and at least one relatively thin skin layer, the former layer providing the majority of the dimensional stability and stiffness of the construction, preselecting the charge for said core layer, as by selection of density or flex modulus, to provide a degree of stiffness suitable for the label or sign application, preselecting the charge for said skin layer to provide a skin adapted to the intended decorating process or surface performance characteristics of the facestock, and combining said extrudate with a pressure-sensitive adhesive layer to form facestock suitable for cutting into labels, tapes or signs, said

step of combining with adhesive occurring in the absence of any preceding step of biaxially stretching said extrudate.

4,888,076

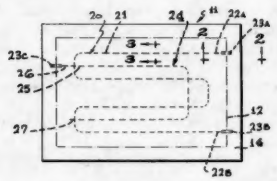
METHOD OF COUPLING OPTICAL FIBERS ENBEDDED IN A MOLDED ARTICLE TO THE EXTERIOR THEREOF

David A. Martin, Northridge, Calif., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Jul. 5, 1988, Ser. No. 215,706

Int. Cl.[4] B32B *31/04*

U.S. Cl. 156—245 **8 Claims**



1. A method of making molded article from a preform made up of moldable materials having an optical fiber embedded therein, the optical fiber having at least one end for coupling to an external optical fiber, the method comprising;

providing an optical fiber having at least one end for coupling to an external optical fiber;

providing a hollow tubular sleeve having first and second ends;

inserting said at least one end of said optical fiber into said first end of said sleeve such that it extends through a portion thereof forming an optical fiber assembly;

providing a mold;

laying up the preform in said mold; embedding said optical fiber assembly in said preform simultaneously with the step of laying up the preform;

molding said preform to form the article; and removing the article from said mold.

4,888,077

METHOD OF MANUFACTURING AN ELECTROLUMINESCENCE DISPLAY DEVICE

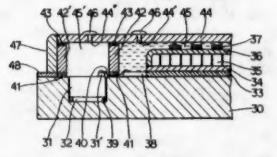
Sang H. Sohn, Kumi, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed Aug. 24, 1987, Ser. No. 88,684

Claims priority, application Rep. of Korea, Aug. 26, 1986, 7093/1986

Int. Cl.[4] B32B *31/06*

U.S. Cl. 156—285 **10 Claims**



1. In a method of manufacturing a display device including a display portion, a panel lead, a glass plate, and a bare chip, the improvement comprising:

forming a groove in said glass plate for receiving said bare chip therein;

forming said panel lead on said glass plate for electrical connection thereof to said display portion of said device;

securing said bare chip in said groove such that an electrode of said chip and said panel lead are substantially at the same height;

electrically connecting said electrode and said panel lead;

providing at least one spacer on said glass plate with a seal between said at least one spacer and said glass plate and extending about said bare chip, said at least one spacer permitting electrical connection of said electrode and said panel lead;

providing a plate on said at least one spacer spaced from said bare chip with a seal between said plate and said at least one spacer;

said glass plate, said at least one spacer and said plate defining an enclosure for said bare chip; and

vacuum sealing said enclosure to vacuum seal said bare chip therein.

4,888,078

LABELS AND MANUFACTURE THEREOF

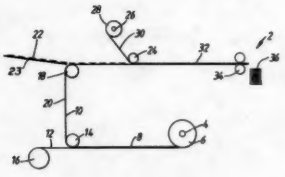
David J. Instance, Guinea Hall, Sellindge, Kent, United Kingdom

Continuation of Ser. No. 895,955, Aug. 13, 1986, abandoned. This application Apr. 18, 1988, Ser. No. 185,279

Claims priority, application United Kingdom, Aug. 14, 1985, 8520417

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—249 **7 Claims**



1. A method of producing labels consisting essentially of the steps of:

(a) providing a length of pressure-sensitive inextensible stock comprising a web of self-adhesive material which is carried on a release backing material;

(b) removing the release backing material from the web of self-adhesive material;

(c) applying a succession of individual folded sheets of printed matter having an outer peripheral edge along the length of a self-adhesive surface of the web of self-adhesive material,

(d) applying a web of laminate material to the self-adhesive surface so as to cover the succession of folded sheets of printed matter adhered thereto; and

(e) cutting through the adhered webs at a succession of locations along the length of the webs so as to form a plurality of individual labels, each of which includes a respective folded sheet of printed matter which is sealed between the two webs around substantially the entire peripheral edge of said folded sheet of printed matter.

4,888,079

METHOD FOR BONDING JOINTS WITH AN ORGANIC ADHESIVE USING A WATER SOLUBLE AMORPHOUS HYDRATED METAL OXIDE PRIMER

Roscoe A. Pike, Granby, and Gerald S. Golden, Windsor, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 21, 1987, Ser. No. 110,989

Int. Cl.[4] C09J *5/04*

U.S. Cl. 156—319 **3 Claims**

1. A method of bonding a plurality of articles together at least one of which is metal by placing a polymeric adhesive in

contact with and between the articles and applying pressure, and optionally heat, to said articles wherein the improvement comprises:

(a) reacting aluminum, titanium, silicon, iron or zirconium with HBr or HI;

(b) oxidizing the reaction product with a water soluble oxidizing agent to form a hydrosol and reduce the anion concentration; and

(c) applying said hydrosol to a surface of at least one of the metal articles prior to applying adhesive on the surface.

4,888,080

PROJECTED PRESS DEVICE FOR RAISING FILM

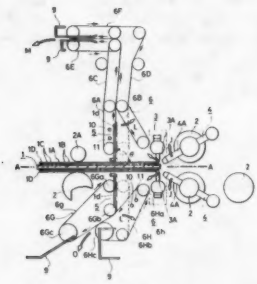
Sigeo Sumi, Saitama, Japan, assignor to Somar Corporation, Tokyo, Japan

Filed Feb. 5, 1987, Ser. No. 11,479

Claims priority, application Japan, Feb. 5, 1986, 61-23178

Int. Cl.[4] B32B *31/18*

U.S. Cl. 156—344 **17 Claims**



1. A film raising device for raising an end portion located at one end of a film laminated on part of a main surface of a panel, for use in a film peeling apparatus, said film raising device comprising:

film press means for pressing against an unlaminated part of the main surface of the panel adjacent the one end of the film when said film press means is in a first position and for pressing against the one end of the film when said film press means is in a second position, said film press means comprising an elongate member extending in a first direction, and having a tip portion at one end for contacting the film when said film press means is in said second position;

holding means for holding said film press means for slidable movement in a second direction toward the panel, said holding means including a hollow cylindrical member, said film press means being disposed in said cylindrical member along an axis thereof, wherein said second direction is substantially the same as said first direction;

first spring means for urging said film press means in said second direction, said first spring means being mounted in said cylindrical member at an end of said elongate member opposite to the one end of said elongate member;

supporting means for supporting said cylindrical member for slidable movement in said second direction, said cylindrical member being rotatable with said supporting means; and,

second spring means for urging said holding means in said second direction relative to said supporting means, said second spring means being mounted on said supporting means;

first transporting means for moving said supporting means to one position at which said film press means is in said first position; and

second transporting means for rotating said supporting means to another position at which said film press means is in said second position,

wherein said first spring means is adapted to keep said tip portion of said film press means biased into contact with said unlaminated part of said main surface of said panel during rotation of said supporting means with said film press means in said first position to said position at which said film press means is in said second position.

4,888,081

DEVICE FOR POSITIONING AND FASTENING A LIGHTWAVE GUIDE TO A BASE

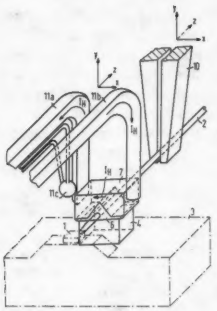
Hans Althaus, Lappersdorf; Werner Kuhlmann, Munich, and Werner Spaeth, Holzkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 855,275, Apr. 24, 1986, Pat. No. 4,741,796. This application Nov. 27, 1987, Ser. No. 126,067

Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519260

Int. Cl.[4] B32B *31/28*

U.S. Cl. 156—359 **4 Claims**



1. A device for positioning and fastening a lightwave guide to a base with a fastening material, wherein a support means supports the lightwave guide and the fastening material and the base is adapted to include a laser diode, the device comprising:

a first manipulator including a first electrode and a second electrode, the support means being clampable between the electrodes such that the manipulator is adapted to position the lightwave guide relative to the base, wherein an electric current passes through the electrodes such that the support means supplies heat energy to the fastening material; and

a second manipulator adapted to grip and position the lightwave guide, wherein the first and second manipulators cooperate to position the lightwave guide;

the support means being separable from the lightwave guide and the fastening material subsequent to fastening the light wave guide to the base.

4,888,082

APPARATUS FOR ADHESIVE TRANSFER

Raymond M. Fetcenko, Elyria, Ohio; Jan Wydro, Lilburn, Ga., and Ralph P. Zuponcic, Hudson, Ohio, assignors to Nordson Corporation, Westlake, Ohio

Filed Oct. 31, 1986, Ser. No. 926,006

Int. Cl.[4] B29B *15/00*; B44C *1/16*; B05C *1/00, 1/14*

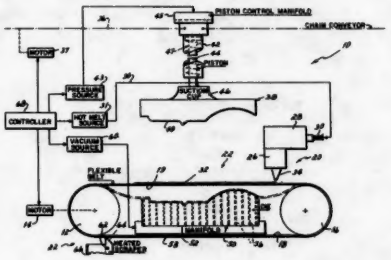
U.S. Cl. 156—500 **7 Claims**

1. Apparatus for applying hot melt adhesive to a parting surface of a section of a foam pattern used in casting metal parts, comprising:

a fixed transfer surface;

applicator means for dispensing hot melt adhesive;

carriage means for moving said applicator means along said fixed transfer surface so that a predetermined pattern of adhesive corresponding in shape to the parting surface of a section of a foam pattern is applied to said fixed transfer surface;



means for moving said parting surface of the section of the foam pattern into contact with the layer of hot melt adhesive on said transfer surface so that at least a portion of the hot melt adhesive adheres to the parting surface;

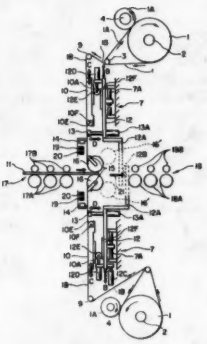
means for moving said parting surface of said section of the foam pattern into contact with a mating parting surface of another section of the foam pattern.

4,888,083

LAMINATOR

Sigeo Sumi; Fumio Hamamura, both of Saitama, and Ichio Fukuda, Tokyo, all of Japan, assignors to Somar Corporation, Tokyo, Japan

Filed Feb. 12, 1988, Ser. No. 155,453
Claims priority, application Japan, Feb. 12, 1987, 62-30294
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—521 **5 Claims**



1. A laminator having a cutter unit for cutting a thin film to be laminated to a substrate, said cutter unit comprising:

a guide member (14A) extending across the direction of feed of the continuous thin film;

a moving member (14B) slidably disposed on said guide member (14A) so as to be movable therealong;

a disk-shaped cutter (14C) provided on said moving member (14B);

a hollow tube (14D) fixedly connected to said laminator and extending parallel to said guide member (14A);

a slider (14E) connected to said moving member (14B) and slidably disposed in said tube (14D) in a sealed manner; and

a drive means for driving said slider (14E) in said tube (14D) for attendantly driving said cutter across the direction of feed of the thin film.

4,888,084

METHOD FOR THE PREPARATION OF TITANIUM NITRIDE WHISKERS

Richard D. Nixdorf, Knoxville, and Mary H. Rawlins, Oak Ridge, both of Tenn., assignors to American Matrix, Inc., Knoxville, Tenn.

Filed Oct. 24, 1988, Ser. No. 261,375
Int. Cl.[4] C30B *1/10, 29/38*
U.S. Cl. 156—600 **15 Claims**

1. A method for the preparation of uniform single crystal titanium nitride whiskers, comprising the steps:

intimately mixing finely divided titanium dioxide powder, carbonized organic fibers and a finely powdered catalyst material selected from metals and compounds having at least one metallic ion selected from cobalt, nickel, magnesium and calcium;

placing said mixture of titanium dioxide, powdered catalyst and carbonized fibers in a closed graphite container, said container provided with a gas inlet;

heating said graphite container in a non-oxidizing atmosphere at about 1300±100 degrees C. for about one hour;

during said heating step, introducing nitrogen gas and a halogen gas into said container through said gas inlet; and

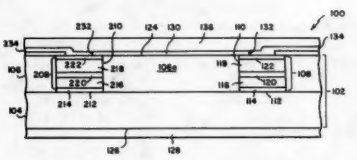
cooling said container and recovering said single crystal titanium nitride whiskers from said container.

4,888,085

PROCESSES FOR THEIR MANUFACTURE OF MONOLITHICALLY INTEGRATED PLANAR LASERS DIFFERING IN EMISSION WAVELENGTHS

Frank T. J. Smith, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 18, 1986, Ser. No. 908,758
The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.
Int. Cl.[4] C30B *25/04*
U.S. Cl. 156—613 **16 Claims**



1. A process of preparing monolithically integrated lasers capable of emitting at differing wavelengths comprising

providing a substrate,

providing superimposed N and P conductivity type cladding layers separated by an active layer at laterally spaced lasing regions on said substrate,

said substrate and said layers together forming a monocrystalline III–V compound structure, wherein the group V ions are ions of arsenic and the group III ions are ions of at least one of gallium and aluminum, and

said active layers at two of said lasing regions differing to generate emissions at differing wavelengths,

characterized in that at least two positive index guided lasing regions capable of emitting at differing wavelengths presenting with said substrate a planar surface of said monocrystalline III–V compound structure are formed by

(a) providing a substrate having adjacent one major surface

a monocrystalline gallium aluminum arsenide isolating portion having a resistivity greater than 10^5 ohm-cm epitaxially grown on an underlying portion of said substrate,

(b) providing on said one major surface a protective layer defining a first opening,

(c) through the first opening creating a first channel in said substrate to expose an unprotected portion of said substrate beneath said one major surface, the first channel having walls at least in part defined by the gallium aluminum arsenide isolating portion of said substrate,

(d) epitaxially depositing from a vapor phase on only said unprotected gallium aluminum arsenide isolating portion of said substrate forming the first channel a first lasing region comprised of said superimposed N and P conductivity type cladding layers separated by said active layer, said active layer being of a higher refractive index than said substrate monocrystalline gallium aluminum arsenide,

(e) terminating epitaxial deposition when said first lasing region forms with said one major surface a planar surface of said III–V compound structure,

(f) providing a protective layer at least in the first opening and defining a second protective layer opening laterally offset from the first opening,

(g) through the second opening creating a second channel in said substrate to expose a second, laterally offset unprotected portion of said substrate beneath said one major surface, the second channel having walls at least in part defined by the gallium aluminum arsenide isolating portion of said substrate,

(h) epitaxially depositing from a vapor phase on only said laterally offset unprotected gallium aluminum arsenide isolating portion of said substrate forming the second channel a second lasing region comprised of said superimposed N and P conductivity type cladding layers separated by said active layer of a higher refractive index than the substrate monocrystalline gallium aluminum arsenide, said active layer of said second laser region differing from said active layer of said first lasing region to generate emissions at a differing wavelength, and

(i) terminating epitaxial deposition when said second lasing region forms with said one major surface a planar surface of said III–V compound structure.

4,888,086

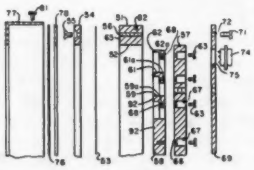
ULTRASONIC METHOD

James M. Hossack, Seattle; Jeffrey E. Powers, Bainbridge, and John K. Billings, Snohomish, all of Wash., assignors to Ultrasonic Arrays, Inc., Woodinville, Wash.

Division of Ser. No. 532,576, Sep. 15, 1983. This application Jun. 9, 1988, Ser. No. 204,605

Int. Cl.[4] C23F *1/00*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—639 **7 Claims**



1. In a method for treating a metallic element for use in a capacitive-type transducer having first and second plates in ultrasonic apparatus for generating ultrasonic energy, providing the element with an optically shiny surface and chemically etching the surface so as to roughen the surface whereby that surface can be utilized for generating ultrasonic energy when said metallic element is used as one of the first and second plates of the capacitive-type transducer.

4,888,087

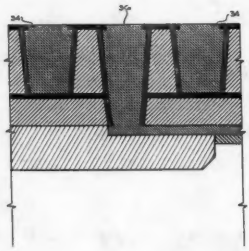
PLANARIZED MULTILEVEL INTERCONNECTION FOR INTEGRATED CIRCUITS

Mehrdad M. Moslehi, Collin County, Tex., and Krishna C. Saraswat, Santa Clara County, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Dec. 13, 1988, Ser. No. 283,738

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **18 Claims**



1. A method of forming a tungsten interconnection array for an integrated circuit comprising the steps of

on a device level of said integrated circuit which is already planarized, forming a thin first layer of nitride covered by a thick first layer of oxide,

forming a second layer of nitride over said first oxide, forming a thick second layer of oxide over said second layer of nitride, forming a thin third layer of nitride over said second layer of oxide,

defining the location of via holes which are to extend through said first and second layers of oxide and said first, second and third layers of nitride by etching said third nitride layer to define the location of metal lines, anisotropically etching said second oxide layer, said second etching nitride layer and said first oxide layer to create oxide trenches with substantially vertical sidewalls defining said via holes,

etching through said nitride layer to open said holes to the underlying planarized device,

depositing tungsten in said via holes to fill said via holes to the level of the third nitride and form a planarized surface having a complete level of metallization.

4,888,088

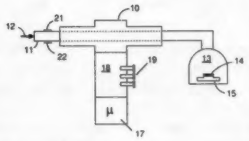
IGNITOR FOR A MICROWAVE SUSTAINED PLASMA

Harry Slomowitz, Walnut Creek, Calif., assignor to Tegal Corporation, Petaluma, Calif.

Filed Mar. 6, 1989, Ser. No. 319,020

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **11 Claims**



1. A method for providing a plasma glow discharge in a plasma reactor containing one or more process gases for treating a semiconductor wafer comprising the steps of:

applying high frequency RF energy to said gas to initiate said plasma; and

applying microwave energy to said gas to sustain said plasma.

4,888,089

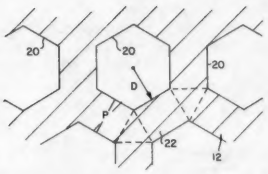
PROCESS OF MAKING AN ELECTRICAL RESISTANCE DEVICE

John A. Marstiller, Marston Mills; Paul H. Bodensiek, Waltham, and Frederick G. Grise, Osterville, all of Mass., assignors to Flexwatt Corporation, West Wareham, Mass.

Continuation-in-part of Ser. No. 138,857, Dec. 29, 1987. This application Jan. 11, 1988, Ser. No. 142,625

Int. Cl.[4] C23F *1/02*; B22C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—644 10 Claims



1. In the method of making an electric resistance device in which a thin layer or film of metal is uniformly deposited on an insulating substrate, that improvement comprising the steps of thereafter selectively removing portions of the metal so deposited such that in a selected area of said device the remaining metal defines a conductive metal pattern comprising a two-dimensional regular array of areas devoid of conductive material ("voids") within a mesh of conductive material,

said voids being arranged such that the centers of the voids forming a set of three adjacent voids are positioned at the corners of an equilateral triangle.

4,888,090

ETCHANT FOR ALUMINUM CONTAINING SURFACES AND METHOD

Nicholas J. Sheetz, Chester, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Dec. 10, 1986, Ser. No. 680,120

Int. Cl.[4] B44C *01/22*; C09K *13/02*

U.S. Cl. 156—665 5 Claims

1. A method for etching aluminum containing surfaces which comprises immersing the surface in an etchant solution heated to a temperature of at least 125° F. for a time period of at least 10 seconds, said etchant solution consisting essentially of at least 90 volume percent water and from 3 to 10 volume percent of an etchant consisting essentially of, per 100 parts by weight of said etchant:

(a) from 15 to 40 parts of an alkali metal hydroxide;

(b) at least 0.2 parts of an alkali metal gluconate;

(c) from about 0.01 to 0.05 parts of ethylene glycol, propylene glycol or hexylene glycol; and

(d) the remainder water.

4,888,091

LOW DENSITY NONWOVEN ARAMID SHEETS

Dennis A. Nollen, and Arthur A. Quinn, both of Newark, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 500,473, Jun. 2, 1983, abandoned. This application Jun. 1, 1984, Ser. No. 616,104

Int. Cl.[4] D21H *5/02*

U.S. Cl. 162—109 22 Claims

1. A low density, nonwoven sheet structure consisting essentially of a commingled mixture of from 30 to 90% by weight of aramid fibrids and complementally from 70 to 10% by weight of short aramid fibers, said sheet comprising at least about 30% by weight fusible aramid, the sheet having uniformly expanded portions enclosed by a pattern of fused, densified regions segmented by spaced interruptions of nonfused regions with the expanded portions being comprised of a chamber formed by two opposed, dense, smooth, skin-like surface strata of said fibrids and fibers which two strata enclose a much less dense interior, the sheet having a sufficiently low porosity to provide a Drip Porosity Test time of at least about 10 seconds.

4,888,092

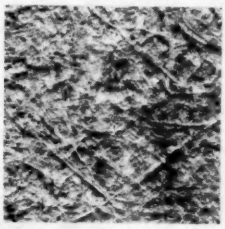
PRIMARY PAPER SHEET HAVING A SURFACE LAYER OF PULP FINES

Zenon Prusas; L. Oscar Uhrig, and Gene W. Wisecup, all of Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Sep. 22, 1987, Ser. No. 99,583

Int. Cl.[4] D21H *5/12*; B32B *29/02*

U.S. Cl. 162—130 15 Claims



1. A paper sheet comprising a primary paper sheet having a layer of pulp fines on the surface thereof, said pulp fines having a particle size which passes through a 100 mesh screen, containing less than 25% fiber and fiber fragments, and containing at least 50% by weight ray cells.

4,888,093

INDIVIDUALIZED CROSSLINKED FIBERS AND PROCESS FOR MAKING SAID FIBERS

Walter L. Dean, Memphis; Danny R. Moore, Germantown; James W. Owens, Memphis; Howard L. Schoggen, Memphis; Robert M. Bourbon, Memphis, and Jeffrey T. Cook, Memphis, all of Tenn., assignors to The Procter & Gamble Cellulose Company, Memphis, Tenn.

Continuation of Ser. No. 879,671, Jun. 27, 1986, abandoned. This application Feb. 23, 1989, Ser. No. 315,204

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.[4] D21M *5/12*; D06M *1/00*

U.S. Cl. 162—157.6 24 Claims

1. Individualized, twisted and curled, crosslinked cellulosic fibers, said fibers comprising cellulosic fibers in substantially individual form having between about 0.5 mole % and about 3.5 mole % crosslinking agent, calculated on a cellulose anhydroglucose molar basis, said crosslinking agent being selected from the group consisting of C_2–C_8 dialdehydes, acid analogues of said dialdehydes derived by having one aldehyde group of each of said dialdehydes replaced by a carboxyl group, and oligomers of said dialdehydes and said acid analogues, said fibers having been maintained in substantially individual form during drying and crosslinking, said crosslinking agent being sufficiently reacted with said fibers in intrafiber crosslink bond form to cause said fibers to have a water retention value of from about 28 to about 45.

4,888,094

METHOD OF OPERATING A HEADBOX APPARATUS FOR A PAPERMAKING MACHINE

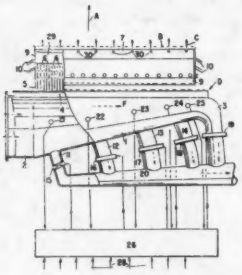
Elmer Weisshuhn, Vogt; Alfred Bubik, Ravensburg; Hans Dahl, Ravensburg; Herbert Hollk, Ravensburg; Rüdiger Kurtz, Immenstaad; Anton Zembrot, Aulendorf; Wolf-Gunter Stotz, Ravensburg; Werner Selder, Ravensburg, and Robert Tröndle, Ravensburg, all of Fed. Rep. of Germany, assignors to Sulzer-Escher WYSS GmbH, Ravensburg, Fed. Rep. of Germany

Division of Ser. No. 873,196, May 19, 1986. This application Jun. 13, 1988, Ser. No. 206,496

Claims priority, application Switzerland, Sep. 19, 1984, 04489/84; Feb. 28, 1985, 00915/85

Int. Cl.[4] D21F *1/06, 1/02*

U.S. Cl. 162—198 44 Claims



1. A method of operating a headbox apparatus for a papermaking machine defining a predetermined machine direction and a predetermined web width, said method comprising the steps of:

infeeding a fiber stock suspension into the headbox apparatus comprising a distribution box, a diffusor system, and a nozzle chamber having a predetermined length and a predetermined width;

sequentially passing said infed fiber stock suspension through said distribution box, said diffusor system and said nozzle chamber and thereby producing a paper web having a predetermined web width;

said step of passing said infed fiber stock through said distribution box entails distributing said infed fiber stock suspension across the predetermined web width;

said step of passing said infed fiber stock suspension through said diffusor system entails throughpassing the infed fiber stock suspension through a plurality of diffusor channels of said diffusor system;

said step of passing said infed fiber stock suspension through said nozzle chamber entails throughpassing said infed fiber stock suspension through a delivery slice of said nozzle chamber and thereby distributing said infed fiber stock suspension at substantially a predeterminate weight per unit area distribution across said predetermined web width;

preselecting a predeterminate opening width of said delivery slice of said nozzle chamber;

said step of passing said infed fiber stock suspension through the headbox apparatus, entails passing said infed fiber stock suspension through said headbox apparatus at a predeterminate throughflow and in a flow direction defining substantially horizontal flow direction components;

during said step of passing said infed fiber stock suspension through said headbox apparatus, flow-controlling the throughflow of said infed fiber stock suspension through said headbox apparatus and thereby establishing said predeterminate weight per unit area distribution of said infed stock suspension across said predetermined web width, a predeterminate flow rate of said infed fiber stock suspension across said predetermined web width, and the alignment of said substantially horizontal flow direction components of said flow direction of the infed fiber stock suspension with the predeterminate machine direction across said predeterminate web width;

said flow controlling step comprising the steps of:

adjusting a preselectable opening width profile of the delivery slice across said predetermined width of said nozzle chamber in a manner such that there is obtained said predeterminate weight per unit area distribution across said predetermined web width; and

controlling said throughflow of said infed fiber stock suspension through said nozzle chamber as a function of said step of adjusting said preselected opening width of the delivery slice; and

said step of controlling said throughflow of said infed fiber stock suspension through said nozzle chamber entailing the step of substantially equalizing said throughflow in terms of flow rate and pressure at preselected locations along the predetermined length and across the predetermined width of said nozzle chamber and thereby substantially eliminating transverse flows from the infed fiber stock suspension passing through the nozzle chamber.

4,888,095

METHOD FOR EXTRACTING WATER FROM A PAPER WEB IN A PAPERMAKING MACHINE USING A CERAMIC FOAM MEMBER

Thomas G. Gulya, Appleton; Gary V. Schultz, Kimberley, and Ronald A. Arnold, Marinette, all of Wis., assignors to Appleton Mills, Appleton, Wis.

Filed May 25, 1989, Ser. No. 356,942

Int. Cl.[4] D21F *1/48*

U.S. Cl. 162—202 7 Claims

1. A method of extracting water from a paper web in a papermaking machine, comprising the steps of forming an article of an open cell polymeric foam material, coating the internal and external surfaces of said polymeric foam material with a liquid slurry of a ceramic material to form a coated article, heating the coated article to an elevated temperature sufficiently high to decompose said polymeric material and to fire said ceramic material to thereby produce a rigid porous mass of foam ceramic material having a plurality of interconnected cells, passing a wet paper web in contact with said porous ceramic foam mass, and draining water from said web through said mass as said web passes in contact with said mass.

4,888,096

ROLL PRESS FOR REMOVING WATER FROM A WEB OF PAPER USING SOLID GROOVED ROLL AND COMPRESSED AIR

Wavell Cowan, Montpelier, Vt., and Stanley McGurk, Toronto, Canada, assignors to Inotech Process Ltd., LaSalle, Canada

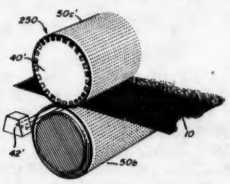
Continuation of Ser. No. 127,439, Dec. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 842,935, Mar. 24, 1986, abandoned, which is a continuation of Ser. No. 619,367, Jun. 11, 1984, abandoned, which is a continuation-in-part of Ser. No. 570,373, Jan. 13, 1984, abandoned. This application Dec. 30, 1988, Ser. No. 292,359

Int. Cl.[4] D21F *3/02*

U.S. Cl. 162—358 3 Claims

1. In the press section of a papermaking machine comprising a pair of paper machine felts for advancing a web of paper being formed, a dewatering apparatus consisting only of a pair of opposed press rolls in an environment at atmospheric pressure, the press rolls being provided one on either side of the felts forming a nip, means pressing the rolls towards each other at the nip to press the felts and the paper web to a maximum mechanical compression, means for providing an air flow across the nip, including means for supplying compressed air only to one of the rolls and exhaust means at the other of the rolls, said means for supplying compressed air only to one of the rolls being located by said one roll for supplying air under

pressure across the roll at the nip, said one roll being in the form of a solid roll having grooves on the periphery thereof, wherein said one roll has axial parallel grooves extending axially of said one roll, and said means for supplying compressed air being located adjacent at least one end of said one roll for passing air through the peripheral axial grooves which form plenums therefor; and exhaust means located at the other of the rolls for draining water and receiving air across the roll at the nip such that the pores of the felt and the web of paper



at the nip are being flushed of water displaced by the air being forced through at the nip and whereby, when the felts and the web of paper have passed the nip and into an atmospheric pressure environment, the water content of the felts and the web will have been greatly reduced, whereby the air is passed under pressure at the nip so formed to thereby evacuate water from the pores of the compressed felts and web at the nip and that as the felts and web exit from the nip at atmospheric pressure, the paper web remains substantially free of water.

4,888,097

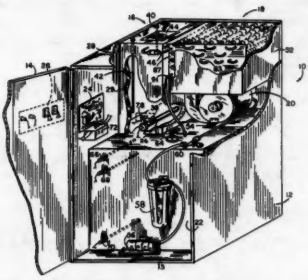
WATER PURIFICATION METHOD AND APPARATUS

David G. Palmer; David J. Shannon, and Keith L. Vacha, all of Lincoln, Nebr., assignors to Pure Water, Inc., Lincoln, Nebr.

Division of Ser. No. 24,257, Mar. 10, 1987, Pat. No. 4,805,692. This application Nov. 16, 1987, Ser. No. 121,098

Int. Cl.[4] B01D *3/42*

U.S. Cl. 203—1 **10 Claims**



8. A method of operating a water purification system having a boiling tank, heating means for converting raw water in said boiling tank to steam at a predetermined conversion rate, condensing means for converting said steam to pure water, and means for conveying steam from said boiling tank to said condensing means, said method including purging raw water and contaminants from the boiling tank in small, frequent batches by performing the steps of:

continuously admitting raw water to said boiling tank from a raw water source at a constant first predetermined rate that is significantly greater than said conversion rate;

sensing the level of raw water in said boiling tank;

producing a first signal during said step of sensing when raw water is below a predetermined level in said tank;

producing a second signal during said step of sensing when raw water is at or above said predetermined level in said tank; and

discharging raw water from said boiling tank in response to said second signal; and not discharging water from said boiling tank in response to said first signal.

4,888,098

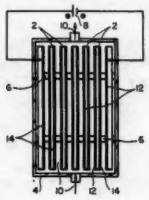
METHOD AND ARTICLES EMPLOYING ION EXCHANGE MATERIAL

Eric D. Nyberg, Belmont; Ken A. Klingman, Menlo Park; Jeff Curtis, San Francisco, and Ray F. Stewart, Redwood City, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 932,763, Nov. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 831,758, Feb. 20, 1986, abandoned. This application Feb. 20, 1987, Ser. No. 17,375

Int. Cl.[4] G01N *27/26*

U.S. Cl. 204—1 R **8 Claims**



1. A method of replacing an ionic species in an ion exchange material containing the ionic species, which method comprises passing a current through a first electrochemical cell which comprises:

(1) a first electrode;

(2) an ion exchange material A which

(a) contains an ionic species I_{1A}, and

(b) is secured to an in electrical contact with the first electrode at an interface;

(3) a second electrode; and

(4) an electrolyte which electrically connects the first and second electrodes and contains an ionic species I_{3A}, which species I_{3A} has the same polarity as the species I_{1A} and maintains its polarity at the interface between the first electrode and the ion exchange material A;

and in which cell an electrochemical reaction takes place at the interface between the first electrode and the ion exchange material A and generates an ionic species I_{2A} which has a polarity opposite to the polarity of the species I_{1A} and causes the ionic species I_{1A} to be replaced by ionic species I_{3A}.

4,888,099

PROCESS FOR THE PRODUCTION OF ALKALI METAL CHLORATE

Bo C. Welander, Saltsjöbaden; Tommy C. K. Öhlin, Nyhamns Läge, both of Sweden, and Ronald P. Jarvis, Lennoxville, Canada, assignors to Eka Nobel AB, Surte, Sweden

Filed Feb. 4, 1987, Ser. No. 10,726

Claims priority, application Sweden, Feb. 10, 1986, 8600555

Int. Cl.[4] C25B *1/26*

U.S. Cl. 204—95 **13 Claims**

1. In the process for the production of an alkali metal chlorate which comprises

(1) electrolyzing an electrolyte that contains an alkali metal chloride in an electrolysis zone to produce an alkali metal chlorate,

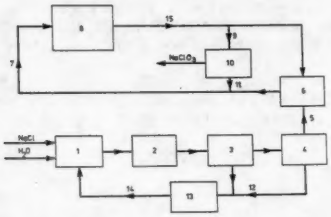
(2) withdrawing a portion of the depleted electrolyte from said electrolysis zone and separating alkali metal chlorate therefrom, and

(3) recirculating the depleted electrolyte remaining after said separation step (2) back to said electrolysis zone together with fresh alkali metal chloride, the improvement which comprises the steps of:

(a) dissolving a solid crude alkali metal chloride in water,

(b) purifying the solution obtained in step (a),

(c) concentrating the purified solution of step (b) by evaporation,



(d) mechanically separating the product of step (c) into a concentrated slurry having a solids content within the range of from 60–95 percent by weight and a mother liquor phase,

(e) withdrawing said mother liquor phase of step (d) and purifying it to remove sulfate,

(f) returning the purified mother liquor phase from step (e) to step (a) and

(g) using said slurry from step (d) as the fresh alkali metal chloride set forth in step (3).

4,888,100

PHOTOCHEMICAL CONVERSION OF CEPHALOSPORINS, 1-CARBA(1-DETHIA)CEPHALOSPORINS AND 1-OXA(1-DETHIA)CEPHALOSPORINS

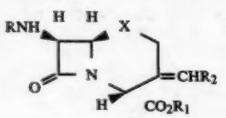
Larry W. Hertel, Indianapolis; John M. Morin, Jr., Brownsburg, and Robert T. Vasileff, Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 15, 1989, Ser. No. 324,169

Int. Cl.[4] B01J *19/08*

U.S. Cl. 204—157.7 **19 Claims**

1. A process for preparing a compound of Formula (I)

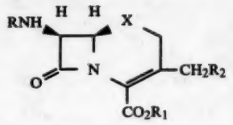


(I)

wherein R is an amino-protecting group, X is —CH_2—, O, or

wherein n is 0, 1, or 2, and R_1 is a carboxy-protecting group; and R_2 is hydrogen, C_1–C_6 alkyl, C_2–C_6 alkenyl, C_2–C_6 alkynyl, C_1–C_6 substituted alkyl, C_2–C_6 substituted alkenyl, C_2–C_6 substituted alkynyl, C_1–C_6 alkoxy, C_1–C_6 alkylthio, C_2–C_6 alkenyloxy, C_2–C_6 alkenylthio, C_2–C_6 alkynyloxy, C_2–C_6 alkynylthio, C_1–C_6 substituted alkoxy, C_1–C_6 substituted alkylthio, C_2–C_6 substituted alkenyloxy, C_2–C_6 substituted alkenylthio, C_2–C_6 substituted alkynyloxy, and C_2–C_6 substituted alkynylthio;

which comprises subjecting a compound of Formula (II)



(II)

to ultraviolet radiation, wherein X, R, R_1 and R_2 are as defined above.

4,888,101

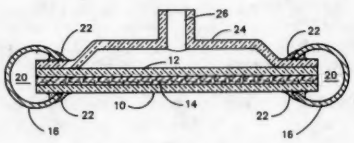
SYSTEM FOR AND METHOD OF PHOTOCATALYTICALLY MODIFYING A CHEMICAL COMPOSITION AND METHOD OF CONSTRUCTING A PANEL UTILIZED IN THE SYSTEM AND THE METHOD

Gerald Cooper, 755 S. 42. St., Boulder, Colo. 80303

Filed Jul. 24, 1986, Ser. No. 888,872

Int. Cl.[4] B01J *19/08;* **B32B** *3/00*

U.S. Cl. 204—157.15 **26 Claims**



1. A system for photocatalytically modifying a chemical composition comprising:

means for maintaining the chemical composition in a fluidized condition;

a semiconductor material in powder form;

a fiber mesh for entrapping said semiconductor powder such that the fluidized chemical composition passes around said semiconductor powder substantially without displacing said semiconductor powder;

means for passing the fluidized chemical composition around said semiconductor powder; and

means for permitting said semiconductor powder to be exposed to electromagnetic radiation such that the electromagnetic radiation impinges upon said semiconductor powder when the fluidized chemical composition passes around said semiconductor powder, whereby the chemical composition is modified.

4,888,102

ELECTROLYTIC CELL WITH REFERENCE ELECTRODE

Robert W. Kessie, Naperville, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

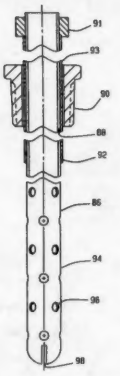
Filed Jul. 28, 1988, Ser. No. 225,411

Int. Cl.[4] C25C *3/34, 7/00*

U.S. Cl. 204—231 **6 Claims**

1. An electrolytic cell comprising a housing, an anode, cathode and reference electrode and adapted to contain a molten-salt electrolyte above said anode, wherein said reference electrode comprises an elongated glass tube of one-piece construction extending from said housing into the interior of said cell and having a lower closed-ended section with ionic conductivity, a metal electrode supported in the glass tube and in separated juxtaposition with the closed end, an electrolyte in the lower section in contact with the electrode and an electrical insulator physically separating the electrode and glass tube; an elongated metal tube extending from the housing over the glass tube as a protective cover and basket, the metal tube having a

perforated side wall adapted to be in contact with the cell electrolyte and being closed-ended with respect to collecting any broken glass from the glass tube so as to act as a basket to



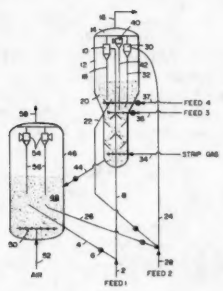
minimize the amount of broken glass from otherwise falling through the electrolyte into the anode; means for supporting the glass tube within the metal tube and means supporting the metal tube in the cell housing.

4,888,103

PROCESS OF STRIPPING IN A CATALYTIC CRACKING OPERATION EMPLOYING A CATALYST MIXTURE WHICH INCLUDES A SHAPE SELECTIVE MEDIUM PORE SILICATE ZEOLITE COMPONENT

Joseph A. Herbst, 60 Bryant Rd., Turnersville, N.J. 08012; Hartley Owen, 5 Riverview Ter., Belle Mead, N.J. 00502, and Paul H. Schipper, 2506 Berwyn Rd., Wilmington, Del. 19810

Filed Sep. 3, 1986, Ser. No. 903,365
Int. Cl.[4] C10G *11/05*
U.S. Cl. 208—73 **20 Claims**



1. An improved process for stripping, or desorbing, entrained hydrocarbon material and where present, sulfur-containing material, from a catalyst mixture recovered from a catalytic cracking reaction zone which comprises:

(a) providing a quantity of catalyst mixture containing at least one entrained material selected from the group consisting of hydrocarbon material and sulfur-containing material, in at least one stripping zone in which a stripping gas removes said entrained material, wherein the catalyst mixture comprises a first catalyst component and a second catalyst component wherein the first catalyst component includes particles of an amorphous cracking catalyst, a large pore crystalline zeolite cracking catalyst or admixtures thereof, and, wherein the second catalyst component comprises particles of a shape selective medium pore crystalline silicate zeolite catalyst, said particles of first and second catalyst components and,

(b) passing ethylene through the stripping zone containing the particles of said shape selective medium pore crystalline silicate zeolite catalyst, thereby conducting an exothermic reaction within the stripping zone continues the second catalyst component, the heat released by the exothermic reaction providing an increase in the temperature of the catalyst in the stripping zone which results in the removal of a greater quantity of entrained material than that occurring in the absence of such exothermic reaction.

4,888,104

CATALYTIC SYSTEM FOR THE HYDROCONVERSION OF HEAVY OILS

Magdalena M. Ramirez de Aqudelo, and Carmen E. Galarraga, both of Los Teques, Venezuela, assignors to Intevep, S.A., Caracas, Venezuela

Filed Sep. 6, 1988, Ser. No. 240,638
Int. Cl.[4] C10G *47/02*
U.S. Cl. 208—112 **12 Claims**

1. A process for the hydroconversion of heavy crude oil which comprises:

(a) introducing into a reaction zone (1) a feedstock of crude oil, (2) hydrogen, (3) an active phase source selected from the group consisting of Group VB metals, Group VIB metals, Group VIIB metals, Group VIIIB metals, Group IA metals, Group IIA metals and mixtures thereof in an amount of from about 10 to about 1000 wppm and (4) from about 0.1 to about 20 wt. % of a refractory carrier material having a surface area in the range of from about 10 to about 700 m^2/g, a total pore volume of from about 0.1 to about 2.0 cm^3/g, an average pore diameter in the range of from about 20 to about 4000 Å, a particle size diameter in the range of from about 1 to about 1000 μm and a pore size distribution according to the following:

Pores of radius, r (Å)	% Total Pore Volume
>1000	from about 0.5 to about 30
1000–300	from about 2 to about 50
300–100	from about 5 to about 60
100–40	from about 5 to about 60
<40	from about 5 to about 30

(b) processing said crude oil, said hydrogen, said active phase source and said refractory carrier material in said reaction zone under hydroconversion conditions so that said crude oil is hydroconverted to liquid products and gas products and a hydroconversion catalyst is formed in situ in said reaction zone, said catalyst comprising said refractory carrier material having said active phase source deposited thereon;

(c) separating a solid phase containing said hydroconversion catalyst from said liquid products and said gas products;

(d) recovering said hydroconversion catalyst from said solid phase; and

(e) recycling said recovered hydroconversion catalyst to said reaction zone.

4,888,105

PROCESS FOR THE DEHYDROCYCLIZATION OF ACYCLIC HYDROCARBONS AND CATALYST COMPOSITION THEREFOR

Albin Huss, Jr., Chadds Ford, Pa.; Sowmithri Krishnamurthy, Cherry Hill, and William D. McHale, Swedesboro, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 16, 1988, Ser. No. 156,067

Int. Cl.[4] C10G *35/085, 35/095*

U.S. Cl. 208—137 **10 Claims**

1. A process for the dehydrocyclization of a feed containing one or more acyclic hydrocarbons capable of undergoing ring closure to provide aromatic hydrocarbons which comprises containing the feed under dehydrocyclization conditions with a zeolite L dehydrocyclization catalyst which is substantially free of zeolite T and which contains at least one Group VIII metal component, thereby converting at least a portion of the acyclic hydrocarbon content of the feed to aromatic compound(s), the zeolite L being prepared by the process which comprises:

(a) providing a reaction mixture, said reaction mixture having a solids loading of at least about 15%, wherein solids loading is defined by the formula

$$100\% \times \frac{\text{Weight of Silica and Alumina}}{\text{Weight of Total Reaction Mixture}}$$

wherein the reaction mixture comprises a source of silicon, a source of aluminum, and a source of potassium cations, wherein the reaction medium has a composition, expressed in terms of molar ratios of oxides, of

SiO_2/Al_2O_3	6 to 30
OH^-/SiO_2	0.3 to 0.8
$K^+/(K^+ + Na^+)$	0.3 to 1
H_2O/OH^-	10 to 50
RN/Al_2O_3	0.2 to 2.0

wherein RN is a source of tetraalkylammonium ion;

(b) maintaining the reaction mixture at about 200° to about 320° F., to produce crystals of zeolite L substantially free of zeolite T; and,

(c) recovering said crystals, said source of silicon being a silica precipitate formed by the process which comprises:

(1) providing a solution of a silicate;

(2) providing a precipitate reagent which is effective to precipitate said silicate from said solution;

(3) maintaining the molar ratio of said silicate to precipitating reagent at least substantially constant; and,

(4) contacting said silicate solution with a precipitating reagent continuously to effect formation of insoluble silica precipitate, whereby the particle size of said silica precipitate ranges from about 1 to about 500 microns.

4,888,106

METHOD OF USING POLYMERIC SULFIDE MINERAL DEPRESSANTS

David W. Lipp, and D. R. Nagaraj, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 182,681, Apr. 18, 1988. This application Jun. 8, 1989, Ser. No. 363,235

Int. Cl.[4] B03D *1/02, 1/06*

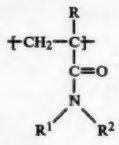
U.S. Cl. 209—167 **5 Claims**

1. A method for the beneficiation of value sulfide minerals, from a sulfide ore containing said value sulfide minerals and a second sulfide mineral with selective separation of value sulfide minerals from said second mineral which comprises:

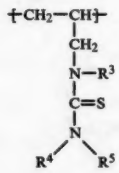
(a) providing an aqueous pulp slurry of finely-divided, liberated ore particles;

(b) conditioning said pulp slurry with an amount of a synthetic depressant effective to depress said second mineral, a value sulfide minerals collector and a frothing agent, respectively, said depressant comprising a polymer comprising:

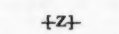
(i) x units of the formula:



(ii) y units of the formula:



(iii) z units of the formula:



wherein each of R, R^1 and R^2, is, individually, hydrogen or a C_1–C_4 alkyl group, R^3 is hydrogen, a C_1–C_4 alkyl group or aryl, R^4 and R^5 are, individually, hydrogen a C_1–C_4 hydrocarbon group or an aryl group and Z represents the polymerization residue of a mononer selected from the group consisting of acrylonitrile, styrene, a cationic, or acrylic, metacrylic or maleic acid or alkali metal salts or alkyl estes of said acids; X represents a residual mole percent fraction; y is a mole percent fraction ranging from about 1.0% to about 50.0%, by weight, based on the total weight of x, y, and z; z is a mole percent fraction ranging from about 0% to about 50.0%, by weight, same basis, and the molecular weight of said polymer is between about 1000 and about 1,000,000; and

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4,888,107

DE-EMULSIFICATION OF OILS

Thomas Easton, and Bryan Thomas, both of Barry, Wales, assignors to Dow Corning Limited, Barry, Wales

Filed Jan. 28, 1988, Ser. No. 149,294

Claims priority, application United Kingdom, Feb. 14, 1987, 8703492

Int. Cl.[4] C10G *33/04*

U.S. Cl. 208—188 **10 Claims**

1. A method for the de-emulsification of emulsions of water and crude oil which comprises treating the emulsion with an organosiloxane having in the molecule at least one quaternary ammonium substituted siloxane unit of the general formula,

$$R_aZSiO_{\frac{3-a}{2}} \quad \text{(i)}$$

in which a has the value 1 or 2, each R represents an oleophylic substituted or unsubstituted hydrocarbon group of up to 10 carbon atoms provided that one of the R's may be a hydroxyl group when a has the value 2, Z represents a quaternary ammonium group

$$R'N^+(R^2)_3X^- \quad \text{(ii)}$$

linked to the silicon atom of the siloxane unit, R' represents a divalent hydrocarbon group linking the silicon and nitrogen atoms, each R^2 represents an alkyl group having up to 20

carbon atoms or a polyoxyalkylene chain having 3 to 50 oxyalkylene groups and X^- represents a halogen ion.

4,888,108

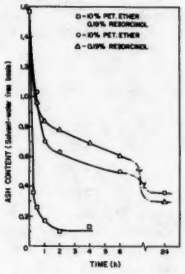
SEPARATION OF FINE SOLIDS FROM PETROLEUM OILS AND THE LIKE

J. Redmond Farnand, Ottawa, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Continuation of Ser. No. 836,427, Mar. 5, 1986, abandoned. This application Jun. 23, 1988, Ser. No. 220,934

Int. Cl.[4] C10G *1/04*

U.S. Cl. 208—424 **11 Claims**



1. A process for reducing the content of fine hydrophobic solids of solvent-diluted materials selected from petroleum oils, bitumen solutions or concentrates, shale oil, and heavy crude oils, said materials having fine hydrophobic solids present, comprising:

(i) (a) in the case of asphaltene-containing materials dispersing an asphaltene-precipitating solvent and optionally a concentrated aqueous solution of an additive selected from the group consisting of resorcinol, catechol, formic acid, maleic acid or anhydride, chloral hydrate and mixtures thereof, throughout said materials,

(b) in the case of such asphaltene-free materials dispersing a concentrated aqueous solution of an additive selected from the group consisting of resorcinol catechol, formic acid, maleic acid or anhydride, chloral hydrate and mixtures thereof throughout said materials,

the amounts dispersed in (a) and (b) and the amounts of water present being sufficient to cause the formation of small agglomerates comprising the hydrophobic solids,

(ii) agitating to form agglomerates of the hydrophobic solids, and

(iii) removing the agglomerated solids from the residual material.

4,888,109

HEMOFILTER FOR USE IN A CONTINUOUS ARTERIO-VENOUS HEMOFILTRATION

Namala L. Manohar, 439-1 Willow Rd. East, Staten Island, N.Y. 10314

Filed Nov. 17, 1988, Ser. No. 272,708

Int. Cl.[4] B01D *13/01*

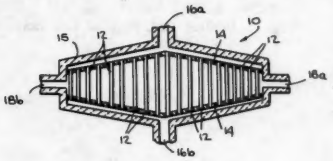
U.S. Cl. 210—94 **14 Claims**

1. A hemofilter for use in a continuous arterio-venous hemofiltration, comprising:

a plurality of hollow fibers of various lengths;

a casing for said plurality of hollow fibers, said casing including a plurality of blood ports; and,

means for securing said plurality of hollow fibers into a bundle, said bundle being located within said casing, said plurality of hollow fibers being grouped in said bundle so that the lengths of said hollow fibers of said bundle would be greatest for those hollow fibers which were located within said bundle nearest to said blood ports and least for said hollow fibers which were located farthest from said blood ports.



4,888,110

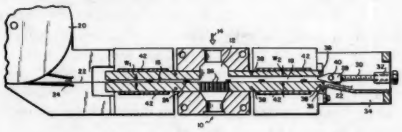
FILTERING DEVICE FOR THERMOPLASTIC MATERIAL

John E. Fogarty, Jr., Millbury, Mass., assignor to Key Filters, Inc., Mass.

Filed Mar. 16, 1987, Ser. No. 25,963

Int. Cl.[4] B01D *33/00, 35/18*

U.S. Cl. 210—106 **8 Claims**



1. A filtering device for filtering a thermoplastic material which is flowable at an elevated temperature and which solidifies at a lowered temperature, said device including:

a housing defining a passage through which said material may be caused to flow under presure at said elevated temperature;

an entry port and an exit port in said housing communicating with said passage;

a continuous filter movable through said entry port, across said passage and through said exit port, with that portion of the filter in said passage being arranged to filter the material flowing therethrough;

cooling means for forming a solidified plug of said material in said exit port, said filter being bonded to said plug and said plug being dimensioned to be forced out through said exit port by the pressure of the flowable material in said passage, thereby imparting a corresponding movement to said filter with the result that said filter is pulled through said entry port and across said passage;

stop means arranged to be contacted by and to oppose the movement of said plug out through said exit port; and

heating means for reheating that portion of said plug in contact with said stop means, said stop means being configured and arranged to subdivide the reheated portion of said plug into multiple continuous segments, with said filter remaining interlocked with one of said segments, the said reheating being sufficient to permit said segments to move past said stop means and to thereby permit said plug to move out through said exit port.

4,888,111

PROCESS FILTER

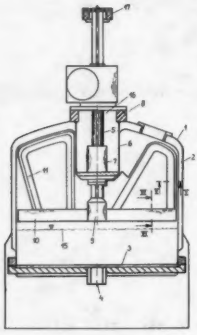
Wolfgang Diemer, Waldstetten, Fed. Rep. of Germany, assignor to Schenk Filterbau GmbH, Fed. Rep. of Germany

Filed Dec. 1, 1987, Ser. No. 127,423

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1986, 3641952

Int. Cl.[4] B01D *29/02*

U.S. Cl. 210—178 8 Claims



1. Filter apparatus comprising in combination:

(a) a container vessel, said vessel having a top, a bottom, and a sidewall, and said vessel being rotatably mounted on a support means for rotation so that the vessel bottom is movable to above the vessel top for drying;

(b) a rotatable adjustable shaft within said container vessel, said shaft being adjustable to different elevational positions within said container vessel, said shaft having a lower end within said vessel and an upper end exterior of said vessel, and said shaft being centrally vertically located within said vessel so that the shaft lower end is spaced from said vessel bottom;

(c) filter means within the container vessel, positioned below said rotatable adjustable shaft and adjacent said vessel bottom;

(d) a central fluid passageway extending within said rotatable adjustable shaft from said upper end to said lower end;

(e) an annular fluid passageway extending with said rotatable adjustable shaft from said upper end to said lower end and encompassing said central passageway;

(f) a hollow paddle support member extending laterally from the lower end of said rotatable adjustable shaft, said support member having an inner end at said shaft lower end and having an outer end adjacent the vessel sidewall, and said paddle support member including an interior consisting essentially of a single fluid passageway extending longitudinally within said support member;

(g) means communicating said shaft central passageway with the inner end of said paddle support member single passageway;

(h) a hollow paddle member mounted on said paddle support member, said paddle member having a shape conforming with the upper portion of said vessel sidewall and with said vessel top, and said paddle member having an outer edge spaced from said vessel sidewall and top;

(i) a single paddle member fluid passageway contained within said paddle member and extending along said outer edge, said paddle member passageway having a first end adjacent said paddle support member outer end and a second end adjacent said rotatable adjustable shaft lower end;

(j) means communicating said paddle support member passageway outer end with said paddle member passageway first end;

(k) means communicating said paddle member passageway second end with said annular passageway lower end of said rotatable adjustable shaft;

(l) scraper means mounted on said paddle member outer edge and extending outwardly therefrom to the surface of said upper portion of the vessel sidewall and to the surface of said vessel top, so that rotation of the rotatable adjustable shaft causes said scraper means to remove caked material from said surfaces when said shaft is adjusted to operating position and rotated; and,

(m) a liquid outlet means centrally located in said vessel bottom in axial alignment with said centrally located rotatable adjustable shaft.

4,888,112

CHROMATOGRAPHIC COLUMN

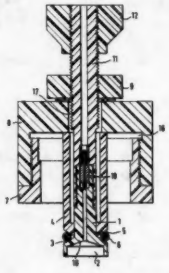
Klaus Kronwald, Sinsheim, Fed. Rep. of Germany, assignor to Labomatic GmbH, Sinsheim, Fed. Rep. of Germany

Continuation of Ser. No. 116,882, Nov. 5, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 332,396

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1986, 3637916

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—198.2 16 Claims



1. A chromatographic column, comprising:

a column made of transparent material having an end and an inner surface;

a tube having an upper and lower part, the lower part having a frit recess for communicating with the interior of the column and having a clamping ring comprising a surface generally facing in one axial direction;

a sleeve surrounding the tube, the sleeve having a counterpiece comprising a surface generally facing in the opposite axial direction;

means for supporting the sleeve on the end of the column;

means for axially moving the tube relative to the sleeve; and

a squeezable seal disposed around the tube and contacting the clamping ring of the tube and the counterpiece of the sleeve, the seal being adapted to move radially outwardly when the tube is moved relative to the sleeve and the seal is squeezed between the clamping ring and the counterpiece, the seal sealingly engaging the inner surface of the column as it moves radially outwardly;

wherein the lower part of said sleeve extends below said sleeve support means to an extent sufficient to permit visual inspection of said seal.

4,888,113

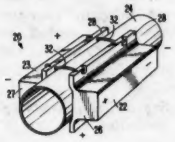
MAGNETIC WATER TREATMENT DEVICE

Robert R. Holcomb, P.O. Box 779, Hamilton, Ala. 35570

Continuation-in-part of Ser. No. 934,568, Nov. 21, 1986, abandoned. This application Dec. 29, 1988, Ser. No. 291,354

Int. Cl.[4] C02F *1/48*

U.S. Cl. 210—222 20 Claims



1. A treatment device for magnetically treating fluid flowing through a pipe, comprising:

a first elongated housing member having two opposite ends in an elongated abutment side for abutting said pipe;

first permanent magnet means fixed in said first housing member, said first permanent magnet means having a positive pole facing the housing member pipe abutment side oriented to one end of said first housing member, and a negative pole facing the housing member pipe abutment side oriented to the opposite end of said first housing member;

a second elongated housing member having two opposite ends and an elongated abutment side for facing said pipe;

second permanent magnet means fixed in said second housing member, said second permanent magnet means having a positive pole facing the housing member pipe abutment side oriented to one end of said second housing member, and a negative pole facing the housing member pipe abutment side oriented to the opposite end of said second housing member; and

attachment means for fixing said abutment sides of said first and second housing members against the pipe, said attachment means holding said first and second housing members on opposing sides of the pipe, said positive magnetic pole facing the pipe and oriented to one end of said first housing member opposing said negative magnetic pole facing the pipe and oriented to one end of said second housing member, and said negative magnetic pole facing the pipe and oriented to the opposite end of said first housing member opposing said positive magnetic pole facing the pipe and oriented to the opposite end of said second housing member.

4,888,114

SINTERED COATING FOR POROUS METALLIC FILTER SURFACES

Joseph L. Gaddis, Clemson, and Daniel A. Jernigan, Seneca, both of S.C., assignors to E. I. Du POnt de Nemours and Company, Wilmington, Del.

Filed Feb. 10, 1989, Ser. No. 310,141

Int. Cl.[4] B01D *39/14*

U.S. Cl. 210—500.25 15 Claims

1. A filter comprising a porous metal substrate formed from particles having a diameter of from 30 to 100 micrometers and a pore size of from 0.5 to 10 micrometers, the pores of which on one side of the substrate are filled to a depth of 30 to 100 micrometers with sintered metal oxide powder having a diameter of from 0.2 to 1.0 micrometers.

4,888,115

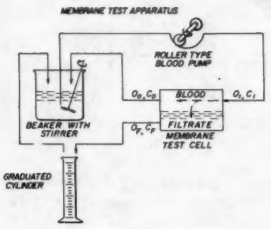
CROSS-FLOW FILTRATION

Paul J. Marinaccio, Monroe, and Ronald V. Repetti, Greenwich, both of Conn., assignors to Cuno, Incorporated, Meriden, Conn.

Filed Dec. 29, 1983, Ser. No. 566,839

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—636 33 Claims



1. A process for the cross-flow filtration of a liquid containing particulate or suspended solid and dissolved solids comprising circulating the liquid tangential to and axially on one side of a charge modified organic polymeric skinless microporous hollow fiber filter membrane, substantially retaining the particulate or suspended solids on said one side, the dissolved solids passing through the membrane and the charge on the membrane repelling similarly charged particulate or suspended particles preventing clogging or blocking of pores through excessive adsorption of said particulate or suspended solids.

4,888,116

METHOD OF IMPROVING MEMBRANE PROPERTIES VIA REACTION OF DIAZONIUM COMPOUNDS OR PRECURSORS

John E. Cadotte, Minnetonka, Minn., and Donald L. Schmidt, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich. and Filmtec Corp., Minneapolis, Minn.

Division of Ser. No. 83,134, Aug. 10, 1987, Pat. No. 4,812,238, and a continuation-in-part of Ser. No. 3,996, Jan. 15, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 286,677

Int. Cl.[4] B01D *13/00*; C02F *1/44*

U.S. Cl. 210—636 11 Claims

1. A method of improving the properties of a reverse osmosis membrane having a polyamide discriminating layer containing a plurality of residual aromatic primary amine groups, comprising treating the polyamide discriminating layer with an aqueous solution of a reagent which reacts with primary amine groups to form diazonium salt groups or derivatives of diazonium salt groups.

4,888,117

METHOD FOR COALESCENCE

Giselle M. Brown, Yateley, and Anthony S. MacFarlane, Lightwater, both of England, assignors to The British Petroleum Company p.l.c., London, England, United Kingdom

Filed May 19, 1988, Ser. No. 196,175

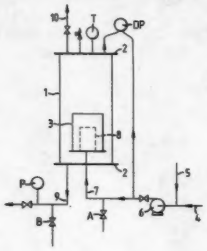
Claims priority, application United Kingdom, May 20, 1987, 8711931

Int. Cl.[4] B01D *17/04*

U.S. Cl. 210—649 8 Claims

1. A method for resolving into its components a stream containing a dispersion of oil and water which method comprises the step of coalescence and gravity separation of said oil

by passing the stream through a coalescer element comprising a sintered polymeric media having a fine porous structure and



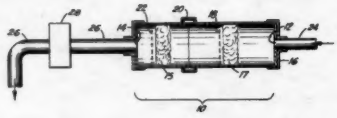
containing pores in the range of 1 to 100 microns and recovering separated oil and separated water from the stream.

4,888,118

WATER PURIFICATION PROCESS AND APPARATUS EMPLOYING NYLON 4

Carl E. Barnes, New Canaan, and Arthur C. Barnes, Norwalk, both of Conn., assignors to Nyodine Products, Inc., Tuxedo, N.Y.

Filed Apr. 18, 1988, Ser. No. 183,006
Int. Cl.[4] B01D *15/00*; C02F *1/68*
U.S. Cl. 210—668 **28 Claims**



1. A process for purifying water containing pathogens which comprises the steps of (a) adding a halogen selected from the group consisting of bromine and iodine to the water to be purified in a first treatment zone in a quantity sufficient to purify the water; and (b) contacting the water containing halogen with polypyrrolidone in a second treatment zone for a period to time which is sufficient to form a complex of halogen and polypyrrolidone and thereby remove the halogen from the water.

4,888,119

CATIONIC/ANIONIC SURFACTANT COMPLEX ANTISTATIC AND FABRIC SOFTENING EMULSION FOR WASH CYCLE LAUNDRY APPLICATIONS

Dean G. Klewsaat, Watchung, N.J., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Filed Oct. 6, 1986, Ser. No. 916,067
Int. Cl.[4] D06M *13/32, 13/46*; C11D *1/86, 17/08*
U.S. Cl. 252—8.75 **7 Claims**

1. A process for manufacturing the microemulsion, an aqueous emulsion of a complex of a cationic surfactant and an anionic surfactant which comprises mixing together the cationic and anionic surfactants in molar proportions in the range of about 1:1 to 1:1.5, respectively, heating such mixture, with continued mixing, until it melts, and becomes clear, and cooling such melt to a temperature at which it solidifies as a complex, mixing about ten parts by weight of such complex and 0.5 to 10 parts of emulsifying agent, heating such mixture, with stirring, to a temperature at which the mixture is liquid, adding aqueous medium slowly to the heated liquid while maintaining its temperature and continuing stirring, until the mixture passes through its inversion point, continuing addition of aqueous medium, with stirring until 15 to 100 parts of aqueous medium have been added.

4,888,120

WATER-BASED DRILLING AND WELL-SERVICING FLUIDS WITH SWELLABLE, SYNTHETIC LAYER SILICATES

Heinz Mueller, Monheim; Claus-Peter Herold, Mettmann; Stephan van Tapavizca, Erkrath; Hans Dolhaine, Duesseldorf; Wolfgang von Rybinski, Duesseldorf, and Winfried Wichelhaus, Mettmann, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 9, 1987, Ser. No. 94,635
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1986, 3631764
Int. Cl.[4] C09K *3/00*
U.S. Cl. 252—8.551 **37 Claims**

1. In a water-based well-servicing fluid that includes a swellable clay for increasing the viscosity of the fluid, the improvement comprising employing as the swellable clay a hightemperature- and electrolyte-stable synthetic hectorite thixotrope of the formula:

$$MgO.aMA.bAl_2O_3.cSiO_2.nH_2O \quad (I)$$

in which
M is Na^+ and Li^+ having an Na:Li ratio of at least 1;
A is F^-, OH^- or $\frac{1}{2}O^{2-}$ or a mixture thereof;
a is 0.1 to 0.6;
b is 0 to 0.3;
c is 1.2 to 1.7; and
n is 0 to 3.0.

4,888,121

COMPOSITIONS AND METHOD FOR CONTROLLING PRECIPITATION WHEN ACIDIZING SOUR WELLS

Walter R. Dill, and Michael L. Walker, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 5, 1988, Ser. No. 177,743
Int. Cl.[4] E21B *43/27*
U.S. Cl. 252—8.553 **10 Claims**

1. An acidizing composition for treating a sour well comprising:
a base acid solution having an initial pH below 1.9;
an iron sequestering agent to combine with iron present in said solution comprising at least one compound selected from the group consisting of aminopolycarboxylic acids, hydroxycarboxylic acids, cyclic polyethers and derivatives of said acids and ethers present in an amount of from about 0.25 to about 5 percent by weight of said acid solution; and
a sulfide modifier to combine with sulfides present in said solution comprising at least one member selected from the group consisting of an aldehyde, acetal, hemiacetal and any other compound capable of forming an aldehyde in solution, present in an amount of from about 1 to about 4 percent by weight of said acid solution, whereby precipitation of ferric hydroxide, ferrous sulfide and elemental sulfur is inhibited as acid spending occurs.

4,888,122

ENGINE OIL ADDITIVE DRY LUBRICANT POWDER

David F. McCready, P.O. Box 1971, Altoona, Pa. 16603

Filed Nov. 24, 1986, Ser. No. 933,940
Int. Cl.[4] C10M *125/10, 147/02*
U.S. Cl. 252—25 **12 Claims**

1. A dry engine oil additive consisting of,
about 50% by weight of a submicron sized first polytetrafluoroethylene (PTFE) powder,
about 50% by weight of a granulated second polytetrafluoroethylene (PTFE) powder capable of withstanding a

higher temperature than the first PTFE powder and having a micron to submicron size, and
about 1% by weight Titanium dioxide.

4,888,123

DETERGENT COMPOSITIONS CONTAINING CALCIUM PYROPHOSPHATE AS AN ANTIDEPOSITION AGENT

Timothy J. Price, Cheshire, and Royston R. Smith, Wirral, both of United Kingdom, assignors to Lever Brothers Company, New York, N.Y.

Filed Jul. 12, 1988, Ser. No. 217,804
Claims priority, application United Kingdom, Jul. 17, 1987, 8716899
Int. Cl.[4] C02F *5/08, 5/14;* C11D *3/06, 3/10*
U.S. Cl. 252—135 3 Claims

1. A detergent composition for washing fabrics, comprising:
(i) from 5% to 40% by weight of a detergent active material;
(ii) from 5% to 75% by weight of a water-soluble carbonate material selected from alkali metal carbonates, bicarbonates and mixtures thereof; and
(iii) from 0.1% to 10% by weight of an antideposition agent which comprises a calcium containing compounds which in a free calcium ion influence test (as herein defined) yields a value of A below 0.5° FH and a value of B above 0.5° FH. and has the general formula

$$Ca_xM_mP_2O_7.nH_2O$$

wherein M is selected from potassium, sodium, hydrogen and ammonium ions, and any mixture thereof, x is from 12.5 to 1.75 m is from 0.5 to 1.52×plus m is approximately equal to 4 and n is greater than zero.

4,888,124

PREPARATION OF STABLE DISPERSIONS OF FINELY DIVIDED POLYISOCYANATES AND PREPARATION OF HEAT-CROSSLINKABLE ISOCYANATE SYSTEMS

Rainer Blum; Horst Belde, both of Ludwigshafen; Rolf Osterloh, Gruenstadt, and Guenter Uhl, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 863,033, May 14, 1986, abandoned. This application Oct. 23, 1987, Ser. No. 112,049
Claims priority, application Fed. Rep. of Germany, May 14, 1985, 3517333
Int. Cl.[4] C09K *3/00;* H05B *33/00*
U.S. Cl. 252—182.2 8 Claims

1. A process for the preparation of a stable dispersion of a finely divided solid polyisocyanate in a liquid which comprises: treating a solid polyisocyanate with one or more polyamines having molecular weights of 400–6000, and thereafter finely dispersing or milling the treated polyisocyanate in the liquid under the action of high-shear forces to form a stable dispersion of solid polyisocyanate in the liquid under the action of high-shear forces to form a stable dispersion of solid polyisocyanate particles containing a polymer shell formed by reaction of the polyamine with the surface of the particles, said reaction consuming from 0.01 to 30% of the total isocyanate groups in the particles.

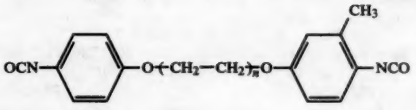
4,888,125

DIISOCYANATES, A PROCESS FOR THEIR PRODUCTION AND THEIR USE IN THE PRODUCTION OF POLYURETHANE PLASTICS

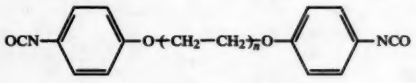
Klaus König, Odenthal, and Peter Heitkämper, Dormagen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Dec. 3, 1987, Ser. No. 128,295
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1986, 3641702
Int. Cl.[4] C07C *118/00;* C08G *18/00*
U.S. Cl. 252—182.21 4 Claims

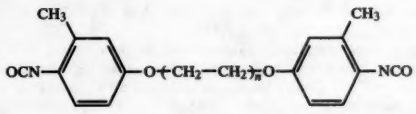
1. A diisocyanate or diisocyanate mixture composed of
(a) from 30 to 100 wt. % of diisocyanate corresponding to the formula



(b) from 0 to 50 wt. % of diisocyanate corresponding to the formula



and
(c) from 0 to 50 wt. % of diisocyanate corresponding to the formula



in which
n has a value of 1, 2, or 3 and the percentages indicated add up to 100.

4,888,126

LIGHT MODULATING MATERIAL AND METHOD FOR PREPARING SAME

Patrick W. Mullen, Green Bay, and Frederick E. Nobile, Depere, both of Wis., assignors to Linear Optics Company, Inc., Green Bay, Wis.

Filed Aug. 28, 1987, Ser. No. 90,793
Int. Cl.[4] G02F *1/13;* C09K *19/54, 19/52, 19/00*
U.S. Cl. 252—299.5 8 Claims

1. A light modulating material comprising a liquid crystal

phase dispersed within a polymer matrix, the polymer matrix comprising an agent for slowly crosslinking the polymer matrix over a period of a few hours to a few days; and an organometallic material selected from the group consisting of titanates, zirconates, and mixtures thereof.

4,888,127

LIQUID CRYSTAL POLYESTER RESIN COMPOSITION HAVING EXCELLENT SURFACE CHARACTERISTICS

Mitsuo Wada; Toshio Kanoe, both of Fuji, and Takayuki Ishikawa, Shimizu, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Dec. 2, 1987, Ser. No. 127,413

Claims priority, application Japan, Dec. 10, 1986, 61-294427

Int. Cl.[4] C09K *19/54;* C08K *5/01*

U.S. Cl. 252—299.5 28 Claims

1. A liquid crystal polyester composition, having excellent surface characteristics, which comprises 99.5 to 30 percent by weight of a polyester and 0.5 to 70 percent by weight of a particulate filler material having an aspect ratio of up to 3 and an average particulate diameter of 1 to 50 μm, the polyester being of a type which is melt processable and which, in the molten state, displays anisotropy.

4,888,128

PAPER-COATING SLIPS CONTAINING FLUORESCENT BRIGHTENERS

Jochen Koll; Friedhelm Müller, both of Odenthal; Werner Bieber, Monheim; Joachim König, Odenthal; Udo Eckstein, Cologne, and Hans Theidel, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

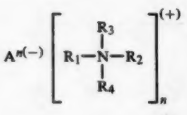
Filed Dec. 11, 1987, Ser. No. 131,780

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, 3643215

Int. Cl.[4] C09B *23/14*

U.S. Cl. 252—301.23 4 Claims

1. Aqueous paper-containing slips based on polymer dispersions, containing virtually water-insoluble fluorescent brightener salts of the formula



(I)

in which

A denotes the anion of a high-affinity, anionic cellulose fluorescent brightener,

R_1, R_2, R_3 and R_4 each independently denote optionally substituted alkyl, alkenyl, phenyll-C_1-C_3-alkyl, phenyl or cycloalkyl,

or any 2 or 3 of these radicals may together, including the N atom, form a morpholine, piperidine, pyrrolidine or pyridine ring, and n denotes an integer >0 with the proviso that at least one of the radicals R_1, R_2, R_3 or R_4 is a hydrophobizing radical selected from the group consisting of C_{10}–C_{20}-alkyl, optionally substituted phenyl-C_1-C_3-alkyl or phenyl.

4,888,129

PROCESS FOR PRODUCING A TERBIUM-ACTIVIATED GADOLINIUM OXYSULFIDE X-RAY PHOSPHOR HAVING A SPECIFIC GREEN/BLUE EMISSION RATIO BY THE ADDITION OF ZINC

Ramon L. Yale, Towanda, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Apr. 24, 1989, Ser. No. 341,886

Int. Cl.[4] C09K *11/84*

U.S. Cl. 252—301.6 S 2 Claims

1. A process for producing a terbium-activated gadolinium oxysulfide x-ray phosphor, said process comprising:

(a) forming a uniform mixture of gadolinium oxide, sulfur, alkali carbonate, alkali phosphate, terbium oxide, wherein said terbium oxide is provided in an amount sufficient to result in a terbium concentration of from about 0.25% to about 0.9% by weight, and a zinc compound wherein said zinc compound is provided in an amount sufficient to result in a zinc concentration of from about 0.05% to about 1.0% by weight, said zinc concentration and said terbium concentration resulting in a green/blue emission ratio in the subsequently produced phosphor of from about 0.7 to about 2.0, said ratio increasing as said zinc concentration increases and as said terbium concentration increases;

(b) heating said mixture in an air atmosphere in a covered vessel at a temperature of from about 900° C. to about 1400° C. for a sufficient time to form terbium-activated gadolinium oxysulfide;

(c) washing said terbium-activated gadolinium oxysulfide with deionized water to remove essentially all of any water soluble impurities which are present; and

(d) annealing the resulting washed terbium-activated gadolinium oxysulfide in air at a temperature of from about 525° C. to about 590° C. for about 1 hour to about 3 hours to enhance the brightness of said phosphor.

4,888,130

PROCESS FOR THE PRODUCTION OF SYNTHESIS GAS

David L. Banquy, Paris, France, assignor to Foster Wheeler USA Corporation, Clinton, N.J.

Continuation of Ser. No. 502,985, Jun. 10, 1983, abandoned, which is a continuation-in-part of Ser. No. 70,671, Aug. 29, 1979, abandoned, which is a continuation-in-part of Ser. No. 934,075, Aug. 16, 1978, abandoned, which is a continuation-in-part of Ser. No. 810,209, Jun. 27, 1977, abandoned. This application Feb. 24, 1988, Ser. No. 161,296

Claims priority, application France, Mar. 22, 1977, 77 08459

Int. Cl.[4] C01B *3/26*

U.S. Cl. 252—373 19 Claims

1. A process for producing, from a desulfurized hydrocarbon-containing feedstock, a synthesis gas having essentially the stoichiometric composition required for methanol synthesis and low CO_2 content, consisting essentially of:

(a) dividing said feedstock into two fractions, the first fraction representing 30 to 95 percent of the total feedstock,

(b) subjecting the first fraction from (a) to a primary steam reforming reaction under a pressure higher than 40 atmospheres, by mixing said fraction with steam, and heating the mixture thereof by indirect heat exchange, in the presence of a reforming catalyst, to form a gaseous effluent including hydrogen to a temperature between 700° and 850° C.,

(c) preheating the second fraction from (a), by indirect heat exchange, to a temperature such that, after mixing said fraction with the gas effluent from (b) in the subsequent step, the mixture thereof is at a minimum temperature of 600° C.,

(d) combining effluent gas streams from (b) and (c) to obtain a gas mixture at a minimum temperature of 600° C. and containing a minimum of 35 percent methane equivalent,

(e) preheating a free oxygen-rich gas to a temperature above 350° C. by indirect heat exchange,

(f) reacting in a single step the gas mixture from (d) with the oxygen rich gas from (e) in a single stage secondary reforming reactor operating under essentially adiabatic conditions, and consisting essentially of a gas mixing zone and a reaction zone, the total amount of free oxygen injected in said mixing zone constitutes the total amount of free oxygen supplied in the process for reaction with the combined effluent gas stream mixture from (d) to produce the synthesis gas and being sufficient to initiate therein the partial oxidation reaction, and the mixing of the reacting gases in said mixing zone being accomplished through a mixing apparatus designed to obtain quasiinstantaneously a homogeneous mixture before the partial oxidation reaction proceeds significantly, and said reaction zone containing a single bed of catalyst or catalysts, whereby the total homogeneous mixture is passed only once through the whole catalyst bed thus producing a synthesis gas containing a percent methane equivalent of less than one-tenth of that of the gas mixture from (d), and a CO_2 content of less than 8 percent by volume.

4,888,131

SYNTHESIS GAS PREPARATION AND CATALYST THEREFOR

Duane A. Goetsch; Geoffrey R. Say; Jose M. Vargas, and Paul E. Eberly, all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 174,174, Mar. 28, 1988, abandoned. This application May 26, 1989, Ser. No. 357,233

Int. Cl.[4] C01B *3/28, 3/30*

U.S. Cl. 252—373 **5 Claims**

1. A process for converting a feed primarily containing methane to carbon monoxide and hydrogen which comprises:

(a) reacting in a fluid bed reaction zone the feed with steam and oxygen at a temperature of at least 1750° F., in the presence of a catalyst containing about 0.5 wt % to about 2.5 wt % nickel on an alpha-alumina support thereby forming a product gas comprising carbon monoxide, hydrogen, and entrained catalyst;

(b) cooling the product gas in a cooling zone to a temperature below about 1200° F.;

(c) maintaining at least about 90% of the synthesis gas formed in the reaction zone as carbon monoxide and hydrogen through the cooling zone, and

(d) wherein the catalyst has a particle density of about 2.4 g/cc to about 3.9 g/cc and the catalyst is substantially free of silica.

4,888,132

AQUEOUS RUST INHIBITOR COMPOSITION

Hitoshi Kohashi; Nobuhiko Shizuka, both of Hyogo, and Yoshihito Kadoma, Osaka, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

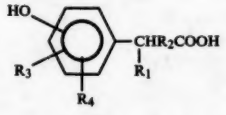
Filed May 25, 1988, Ser. No. 198,350

Claims priority, application Japan, Jun. 12, 1987, 65-147628

Int. Cl.[4] C23F *11/12*

U.S. Cl. 252—393 **8 Claims**

1. An aqueous rust inhibitor containing a soap of (i) a hydroxyaryl fatty acid and (ii) an alkali metal, wherein the soap is present in an amount of 0.05–5 wt % based on the total amount of the aqueous rust inhibitor; and wherein the soap is represented by the following formula (I):



(I)

wherein R_1 is a straight chain alkyl group having 1 to 19 carbon atoms; R_2 is a straight chain alkylene group having 1 to 19 carbon atoms, with the sum of carbon atoms in R_1 and R_2 being 10 to 20; R_3 and R_4 are each a hydrogen atom, a hydroxyl group, an alkyl group having 1 to 9 carbon atoms, or an alkoxyl group having 1 to 9 carbon atoms; and M is an alkali metal cation.

4,888,133

ANTIOXIDANT SURFACTANTS

Thommy Carlson, Helsingborg, Sweden, assignor to Nestec S.A., Vevey, Switzerland

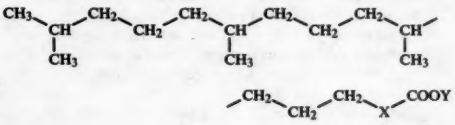
Division of Ser. No. 794,519, Nov. 4, 1985, Pat. No. 4,745,199. This application Jan. 28, 1988, Ser. No. 149,360

Claims priority, application European Pat. Off., Nov. 29, 1984, 84114490

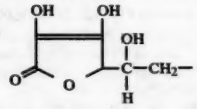
Int. Cl.[4] C09K *15/06*

U.S. Cl. 252—400.61 **7 Claims**

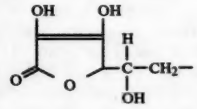
1. An antioxidant composition comprising a compound having the general formula:



or salts thereof wherein X is selected from the group consisting of a methylene radical and an isopropylene radical and Y is a residue selected from the group consisting of a residue of L-ascorbic acid having the formula:



and a residue of D-isoascorbic acid having the formula:



in an aqueous medium wherein sufficient water is present for inducing a lamellar liquid crystalline phase.

4,888,134

CONDUCTIVE FOAMS

Jean-Pierre Kleitz, Bischwiller, and Piere H. A. Mertzeisen, Kilstett, both of France, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 47,294, May 8, 1987, abandoned. This application Jul. 19, 1988, Ser. No. 221,050

Claims priority, application France, Jun. 2, 1986, 86 07881

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 **12 Claims**

1. A method for the production in the absence of isocyanates of a conductive foam having a surface resistance of not more than 9.9×10^{10} ohms as measured by DIN #53,345, comprising:

(i) preparing a compound comprising per 100 parts by dry weight of an aqueous emulsion of a rubbery polymer emulsified with a soap, up to 150 parts by weight of one or more particulate filters, selected from the group consisting of calcium carbonate, clay, talc, dolomite, barytes, aluminum trihydrate and glass microspheres; up to about 8 parts of a vulcanization paste; up to 10 parts by weight of a gelling agent and from 4 to 30 parts by dry weight of an

aqueous emulsion containing up to 50 weight percent of carbon black emulsified with a soap;

(ii) mechanically frothing said compound to a density from 80 to 600 g/l;

(iii) forming said frothed compound to a desired shape;

(iv) gelling said frothed compound; and

(v) vulcanizing said frothed compound.

10. A method for the production of a conductive foam having a surface resistance of not more than 9.9×10^{10} ohms as measured by DIN #53,345 comprising:

(i) preparing a compound comprising per 100 parts by dry weight of an aqueous emulsion of a rubbery polymer emulsified with one or more synthetic emulsifiers selected from the group consisting of sulfosuccinamates, alkyl sulfates and alkyl sulfonates, up to 250 parts by weight of one or more particulate fillers selected from the group calcium carbonate, clay, talc, dolomite, barytes, aluminum trihydrate, and glass microspheres; up to 8 parts of a vulcanization paste and from 4 to 30 parts by dry weight of an aqueous emulsion of carbon black emulsified with one or more synthetic emulsifiers selected from the group consisting of sulfosuccinamate, C_{8-20} alkyl sulfates, and C_{8-20} alkyl sulfonates which contains up to 50 weight percent of carbon black;

(ii) frothing said compound to a density from 80 to 600 g/l;

(iii) spreading said compound over a substrate;

(iv) setting said frothed compound, and

(v) vulcanizing said frothed compound.

4,888,135

ELECTRICALLY CONDUCTIVE POWDER AND ELECTRICALLY CONDUCTIVE COMPOSITION USING THE SAME

Masayuki Tsunaga; Kazuaki Yuba, both of Saitama, and Youichi Kaneko, Hiroshima, all of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1986, Ser. No. 913,030

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—512 **2 Claims**

1. An electrically conductive composition comprising: an electrically conductive powder consisting of copper particles in an amount 87.0–99.89% by weight, a silver coating material coated on a part or the total of the surface of the copper particles in an amount 0.1–8.0% by weight, and a titanate coupling agent combined to the copper particles and silver coating in an amount 0.01–5.0% by weight; and a binder resin in an amount 5.0–50.0% by weight of the amount of the electrically conductive powder, wherein the binder is selected from the group consisting of a phenolic resin, epoxy resin, acrylic resin, polyester resin and olefin resin.

4,888,136

NEW FLAME RETARDANT COMPOSITIONS OF MATTER AND CELLULOSIC PRODUCTS CONTAINING SAME

Karumpatti L. Chellapa, Houston, Tex., and Mukund C. Shah, Hazlett, N.J., assignors to Witco Corporation, New York, N.Y.

Filed May 2, 1988, Ser. No. 189,058

Int. Cl.[4] C09K *21/00*; D06P *5/00*; D06M *13/34*; D21D *3/00*

U.S. Cl. 252—607 **37 Claims**

1. A com position useful as a flame retardant for cellulosic material which comprises ammonium bromide and a flame retardant enhancing amount of at least one water-soluble aluminum salt of an organic hydroxy acid.

12. A flame retardant cellulosic composition comprising cellulosic material and a flame retardant effective amount of a flame retardant composition comprising ammonium bromide and a flame retardant enhancing amount of at least one water-soluble aluminum salt of an organic hydroxy acid.

4,888,137

NOVEL 1,4-BIS(SUBSTITUTED-AMINO(-5,8-DIHYDROXYANTHRAQUINONES AND LEUCO BASES THEREOF

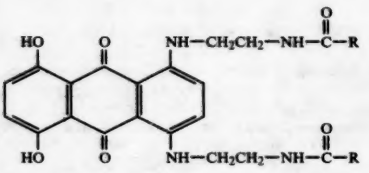
Keith C. Murdock, Pearl River, N.Y., and Frederick E. Durr, Ridgewood, N.J., assignors to American Cyanamid Company, Wayne, N.J.

Continuation-in-part of Ser. No. 485,143, Apr. 15, 1983, abandoned, which is a division of Ser. No. 244,452, Nov. 2, 1981, Pat. No. 4,430,501, which is a division of Ser. No. 63,285, Aug. 2, 1979, Pat. No. 4,278,689, which is a division of Ser. No. 923,602, Jul. 11, 1978, Pat. No. 4,197,249, which is a continuation-in-part of Ser. No. 873,040, Jan. 30, 1978, abandoned, which is a continuation-in-part of Ser. No. 824,872, Aug. 15, 1977, abandoned. This application Apr. 27, 1987, Ser. No. 42,779

Int. Cl.[4] C07C *103/75*

U.S. Cl. 552—248 **10 Claims**

1. A compound selected from the group consisting of those of the formula:



wherein R is hydrogen, alkyl (C_1–C_3), trifluoromethyl, acetyl, ethoxy or carbomethoxy; the leuco bases and tautomers thereof; and the pharmacologically acceptable acid-addition salts thereof.

4,888,138

SUBSTITUTED AMMONIUM CARBAMATES AND METHOD FOR PREPARING SAME

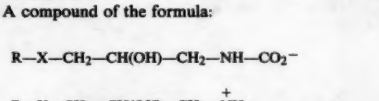
Kathleen S. Laurenzo, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 10, 1988, Ser. No. 269,363

Int. Cl.[4] C07C *91/04, 91/12, 125/02*

U.S. Cl. 562—555 **14 Claims**

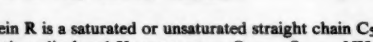
1. A compound of the formula:



(I)

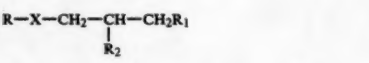
wherein R is a saturated or unsaturated straight chain C_5–C_{18} aliphatic radical and X represents —O—, —S—, —NH— or —CH_2—.

11. A process for preparing the hydrochloride, hydrobromide or acetate salt of a compound corresponding to the formula:



(III)

wherein R is a saturated or unsaturated straight chain C_5–C_{18} aliphatic radical and X represents —O—, —S—, —NH— or —CH_2— which comprises reacting a compound corresponding to the formula:



(II)

in which R and X are as defined previously and R_1 and R_2 together represent an epoxy radical with ammonium carbamate to form a compound corresponding to the formula:

$$R{-}X{-}CH_2{-}CH(OH){-}CH_2{-}NH{-}CO_2^- \quad (I)$$

$$R{-}X{-}CH_2{-}CH(OH){-}CH_2{-}\overset{+}{N}H_3$$

in which R and X are as defined previously and thereafter reacting the compound of formula (I) with hydrogen chloride, hydrogen bromide or acetic acid to form the corresponding salt of the compound of formula (III).

14. A process of claim 11 wherein the compound of formula (I) is 3-decyloxy-2-hydroxypropylcarbamic acid, 3-decyloxy-2-hydroxypropylammonium salt, the compound of formula (II) is (decyloxy)methyloxirane and the compound of formula (III) is 1-amino-3-decyloxy-2-propanol.

4,888,139

PROCESS FOR PREPARING CHF2OCHFCF3 AND CHF2OCHClCF3 AND NOVEL INTERMEDIATE COMPOUNDS EMPLOYED THEREIN

Donald F. Halpern, Fanwood, and Mark L. Robin, South Plainfield, both of N.J., assignors to BOC, Inc., Murray Hill, N.J.

Division of Ser. No. 220,129, Jul. 18, 1988, Pat. No. 4,855,511.
This application Jan. 25, 1989, Ser. No. 301,684
Int. Cl.[4] C07C *53/40, 53/48*
U.S. Cl. 562—840 2 Claims

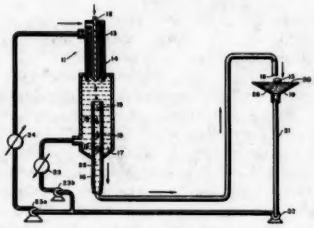
2. A compound of the formula $CHCl_2OCHClCOCl$.

4,888,140

METHOD OF FORMING FLUID FILLED MICROCAPSULES

Herman W. Schlameus; Chel W. Lew, both of San Antonio, Tex., and Donald M. Atkinson, West Haven, Conn., assignors to Chesebrough-Pond's Inc., Greenwich, Conn.

Filed Feb. 11, 1987, Ser. No. 13,315
Int. Cl.[4] A61J *5/04*
U.S. Cl. 264—4.3 6 Claims



1. A method of improving the integrity of the seamless shell of a round, fluid filled, microcapsule formed by the simultaneous extrusion, from coaxially aligned and concentric extrusion nozzles into a surrounding carrier fluid moving in the direction of the extrusion, of (1) a fluid filler material, which is immiscible with a hardenable fluid material used in forming the shell, and (2) said hardenable fluid material used in forming the shell, which method comprises introducing into the carrier fluid an effective amount of a surfactant having affinity with the carrier fluid to improve the integrity of the shell of the microcapsule upon hardening of the fluid material used in forming the shell.

4,888,141

PROCESS FOR PRODUCING POLYETHYLENE ARTICLES HAVING A HIGH TENSILE STRENGTH AND MODULUS

Cornelis W. M. Bastiaansen, Sittard; Pieter J. Lemstra, Brunssum, and Lambert H. T. Van Unen, Heerlen, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Continuation of Ser. No. 897,935, Aug. 19, 1986, abandoned.
This application Oct. 9, 1987, Ser. No. 106,457
Claims priority, application Netherlands, Aug. 21, 1985, 8502298
Int. Cl.[4] B29C *35/08*
U.S. Cl. 264—22 10 Claims

1. A process for producing polyethylene articles having a high tensile strength and a high modulus, comprising:

irradiating a solid, particle-shaped, linear polyethylene having a lamellar structure, a low degree of entanglement and a weight-average molecular weight of at least 4×10^5;

transforming the irradiated polyethylene into an article at a temperature above the melting point of the polyethylene;

cooling the article to a temperature below the melting point of the polyethylene; and

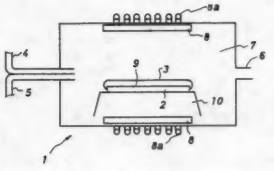
stretching the article, in a plurality of steps, with an increasing temperature, which is below the melting point of the polyethylene article, to form a polyethylene article having a high tensile strength and a high modulus.

4,888,142

PROCESS FOR PRODUCING β-FORM SI_3N_4

Kenrou Hayashi; Reiji Oguma, both of Hadano, and Masayuki Tamura, Chigasaki, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 834,818, Feb. 28, 1986, abandoned.
This application Dec. 22, 1987, Ser. No. 139,109
Claims priority, application Japan, Apr. 11, 1985, 60-77157
Int. Cl.[4] F27B *9/04;* B29C *67/00*
U.S. Cl. 264—65 18 Claims



1. A process for producing a β-form Si_3N_4 article, comprising the steps of:

depositing a Si_3N_4 starting material comprising less than about 0.5% by weight of impurities on a substrate by chemical vapor deposition;

firing the Si_3N_4 deposit in a non-oxidizing atmosphere consisting essentially of one of N_2, NH_3 and mixtures thereof under an elevated pressure of at least about 2 atm at a temperature of at least about 1700° C. so as to obtain a Si_3N_4 article comprising at least about 60% by weight of β-form Si_3N_4; and

removing the substrate after the deposition step.

4,888,143

FAST TEMPO FIRING PROCESS FOR CERAMIC MATERIALS SUCH AS TILES

Mauro Poppi, Modena, Italy, assignor to Poppi s.P.A., Castellarano, Italy

Filed Oct. 23, 1986, Ser. No. 922,285
Claims priority, application Italy, Nov. 29, 1985, 40129 A/85
Int. Cl.[4] F27B *9/02*
U.S. Cl. 264—66 7 Claims

1. A process for fast tempo firing of ceramic materials such as tiles and the like, the process comprising:

transferring the ceramic materials among a plurality of stages within a heating zone of a kiln, such transfers among stages occurring one after the other in quick succession;

heating each of said plurality of stages to a different temperature than each adjacent stage;

exposing the ceramic materials to sudden changes in temperature upon their entry into each stage;

maintaining the ceramic materials in a given stage for a short period of time for allowing them to stabilize in temperature; and

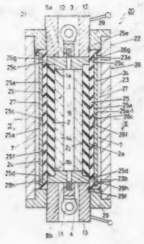
simultaneously with said step of maintaining, continuously moving the ceramic materials in an alternating back and forth motion, by means of a plurality of rollers which can rotate in alternating directions and which are located within the given stage, for the duration of time during which the materials are maintained in the given stage.

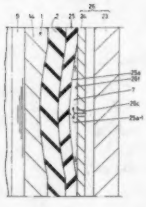
4,888,144

DRY-TYPE RUBBER PRESSING METHOD

Isao Matsushita, Hyogo, and Hideo Iijima, Aichi, both of Japan, assignors to Inax Corporation, Aichi, Japan

Filed Jun. 2, 1987, Ser. No. 57,388
Claims priority, application Japan, Apr. 27, 1987, 62-104952; Apr. 27, 1987, 62-104953; Apr. 27, 1987, 62-104954
Int. Cl.[4] B29C *43/14;* B28B *21/18*
U.S. Cl. 264—120 3 Claims





1. A method of pressure-molding powder disposed in a powder filling space defined in a flexible pressure membrane, the flexible pressure membrane having a wall including a pressure bearing surface disposed exteriorly of the powder filling space, and the powder filling space having at least one end portion, said method comprising:

initially subjecting a local portion of the flexible membrane at the pressure bearing surface thereof to fluid under pressure sufficient enough to effect a curved deformation of said flexible membrane extending toward said powder filling space at said local portion thereof thereby squeezing a portion of the powder disposed in the powder filling space at said curved local deformation; and

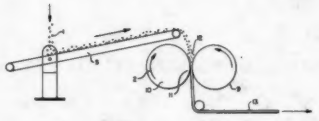
further subjecting the flexible membrane at the pressure bearing surface thereof to fluid under pressure to contiguously increase the curved deformation of the flexible membrane toward the powder filling space from said local portion to the at least one end portion of the powder filling space thereby progressively squeezing the remainder of the powder disposed in said powder filling space from a location adjacent said curved deformation to a location at each said end portion of the powder filling space.

4,888,145

PROCESS FOR PRODUCING A SYNTHETIC RESIN SHEET, ESPECIALLY FOR A MULTICOLOR PATTERN

Kurt Allner, Troisdorf-Eschmar; Hans Brinkmann, Troisdorf; Bernhard Kraemer, and Herbert Schulte, both of Troisdorf-Oberlar, all of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

Filed Sep. 23, 1983, Ser. No. 535,256
Claims priority, application Fed. Rep. of Germany, Sep. 23, 1982, 3235166
Int. Cl.[4] B29C *43/30*
U.S. Cl. 264—126 2 Claims



1. A process for the production of a thick synthetic resin sheet free of voids by processing heated thermoplastic chips into a coherent sheet by use of a pair of rolls, characterized in that the chips, heated to about 140°–160° C., are drawn into a roll nip which is formed by said pair of rolls each having a peripheral profiled surface, said profiled surface including channels extending helically in a crosswise arrangement and texturing elements formed between said channels, the channels having a depth of about 0.1–0.5 mm and the size of the roll nip formed between peripheral surfaces of the texturing elements being about 0.2–1.5 mm, the chips are partially differently densified at a roll temperature of about 120°–180° C. and a linear pressure in the roll nip of 100–600 kg/cm, during which the air occluded in between the chips is removed and allowed to escape by way of the profiled roll surfaces, and the chips are molded into a coherent, void-free sheet having a thickness of at least 1.5 mm with an embossed surface on each side thereof.

4,888,146

METHOD AND APPARATUS OF FORMING EXTRUDED ARTICLE

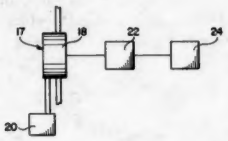
James V. Dandeneau, 55 Tarkiln Rd., Harrisville, R.I. 02830

Filed May 19, 1988, Ser. No. 196,016
Int. Cl.[4] B29C *47/74*
U.S. Cl. 264—171 15 Claims

1. The method of extrusion forming an article in the form of a continuous elongated strand wherein finite length portions of said strand form the article and the article has first and second terminal end portions formed of compatible first and second melt mixable plastics exhibiting differing physical properties

and an intermediate connecting portion formed of a melt extrusion blending of the first and second plastics connecting the end portions, comprising, continually extruding both said first and second plastics from separate extrusion sources to an extrusion head having a downstream longitudinally directed common article extrusion path and separate upstream longitudinally directed first and second dump extrusion paths so as to direct said first plastic through said article extrusion path for subsequent cooling and processing to form said article while simultaneously laterally directing said second plastic through said second dump path to waste and thereafter intermittently and in timed sequence quickly redirecting the extrusion paths of said first and second plastics so as to longitudinally direct said second plastic through said article extrusion path and said first plastic laterally through said first dump path.

8. Apparatus for forming an article in the form of a continuous elongated strand wherein finite length portions of said strand form the article and the article has first and second



terminal end portions formed of compatible first and second melt mixable plastics exhibiting differing physical properties and an intermediate connecting portion formed of a melt extrusion blending of the first and second plastics connecting the end portions, comprising, a pair of extruders connected to a common extrusion head in turn having a downstream longitudinally directed common article extrusion path and separate upstream first and second dump extrusion paths, said first and second dump extrusion paths each comprising a first upstream longitudinally directed sector substantially parallel to said common article extrusion path and a second downstream laterally directed sector open to waste, said first sector of each said dump extrusion path and said common extrusion path comprising an overall longitudinally directed composite path through which said article is extruded, and rotational means in said head for quickly directing and redirecting said first and second plastics from said extruders sequentially from said article extrusion path to one said dump paths and vice versa.

4,888,147

PROCESS FOR PRODUCTION OF CELLULOSE ACETATE MOLDING MATERIALS

Naoki Mochida, and Hiroaki Sawada, both of Toyama, Japan, assignors to Mitsubishi Rayon Co., Ltd. and Mitsubishi Acetate Co., Ltd., both of Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 254,767

Claims priority, application Japan, Oct. 8, 1987, 62-252573; Oct. 9, 1987, 62-253869

Int. Cl.[4] D01F *2/02, 2/30*

U.S. Cl. 264—207 **10 Claims**

1. A process for producing a cellulose acetate molding material which comprises dissolving cellulose diacetate in a mixed solvent of acetone and water to prepare a dope and then dry spinning or dry film forming the dope, wherein at least one compound selected from the group consisting of water-soluble salts and bases is dissolved in the water to be used in preparation of the dope in an amount of 2×10^{-4} to 1×10^{-2} gram equivalent per kilogram of the cellulose diacetate thereby preventing formation of acetone-insoluble gels.

4,888,148

METHOD OF MAKING EXTRUDED AMORPHOUS THERMOPLASTIC PIPE HAVING REDUCED INTERNAL STRESS

J. Ernst Hartitz, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 15, 1988, Ser. No. 232,070

Int. Cl.[4] B29C *47/90*

U.S. Cl. 264—209.5 **14 Claims**

1. A process for the production of a hollow product having a final inner diameter and a final outer diameter to define a final wall thickness therebetween and a cross-sectional shape, said product being formed from amorphous thermoplastic comprising polyvinyl chloride and/or chlorinated polyvinyl chloride, said method comprising the steps of

(1) charging said thermoplastic into an extruding apparatus including a processing portion and die means and processing said thermoplastic through said processing portion;

(2) discharging said thermoplastic through said die means at a rate of N feet per minute to form an extrudate, said extrudate having a cross-sectional shape corresponding to the cross-sectional shape of said product, and having an inner diameter and an outer diameter to define wall thickness therebetween;

(3) allowing said extrudate to freely expand as a result of melt swell and thereby permit relaxation of internal stresses within said extrudate resulting from said processing, said expansion bringing the extrudate inner diameter to within about 110 percent of the final inner diameter and bringing the extrudate outer diameter to within about 110 percent of the final outer diameter;

(4) drawing said extrudate from the die from within plus or minus 10 percent of N feet per minute; and

(5) bringing said inner diameter to said final diameter and said outer diameter to said final outer diameter.

4,888,149

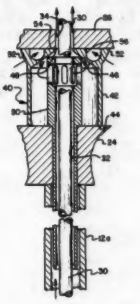
WEAR-REDUCTION-SHIELD FOR THIMBLES

William J. Bryan, Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Sep. 27, 1988, Ser. No. 250,057

Int. Cl.[4] G21C *11/00, 17/00*

U.S. Cl. 376—287 **4 Claims**



1. A wear-reduction-shield for thimbles of pressurized water nuclear reactors to reduce flow-induced vibrations in a thimble length portion located between a fuel assembly and a core plate upon which the fuel assembly sits and to provide stability to the fuel assembly and thereby reduce its ability to tip relative to the core plate, said shield comprising:

a hollow generally cylindrical body portion having a core plate engaging surface portion;

a tapered internal end wall portion defining a circular opening for a thimble coaxial with the cylindrical body portion

and of a diameter smaller than the diameter of the cylindrical body portion: and

means on said body portion for engagement with the fuel assembly at a plurality of symmetrically located points radially beyond the cylindrical body portion.

4,888,150

CONTROL ROD FOR NUCLEAR REACTORS

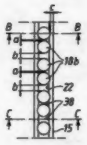
Gunnar Vesterlund, Västeras, Sweden, assignor to ABB Atom AB, Vasteras, Sweden

Filed Dec. 28, 1988, Ser. No. 291,254

Claims priority, application Sweden, Jan. 11, 1988, 8800048

Int. Cl.[4] G21C *7/10*

U.S. Cl. 376—333 **3 Claims**



1. A control rod for nuclear reactors, comprising a number of absorber plates (13–16) which are connected to each other along a centre line on the rod and which are each provided with a plurality of bored channels (18), which extend at least substantially perpendicularly to the centre line of the rod, contain boron carbide or other absorber material (20) which swells upon irradiation and are sealed off from communication with the surroundings of the control rod, characterized in that within at least one region of an absorber plate each channel (18*b*) is arranged at a smaller distance (a) to an adjacent channel than (c) to the surface of the absorber plate.

4,888,151

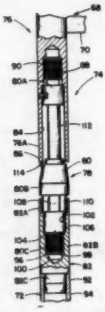
RECONSTITUTABLE CONTROL ASSEMBLY HAVING REMOVABLE CONTROL RODS WITH DETACHABLE SPLIT UPPER END PLUGS

Robert K. Gjertsen, Columbia; Ronald P. Knott, Irmo, and James A. Sparrow, Columbia, all of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 232,970, Aug. 17, 1988, abandoned. This application Dec. 15, 1988, Ser. No. 284,566

Int. Cl.[4] G21C *7/10*

U.S. Cl. 376—327 **10 Claims**



1. In a reconstitutable control assembly for use with a nuclear fuel assembly, said control assembly including a spider structure and at least one control rod, an attachment joint for detachably fastening said control rod to said spider structure, said attachment joint comprising:

(a) a hollow connecting finger on said spider structure; and

(b) an elongated detachable split upper end plug on said control rod having a pair of separate upper and lower plug portions, said upper plug portion having integrally-connected tandemly-arranged upper, middle and lower sections, said lower plug portion having integrally-connected tandemly-arranged upper, middle an lower segments;

(c) said upper section of said upper plug portion being rigidly attached to said connecting finger on said spider structure, said lower segment of said lower plug portion being rigidly connected to said control rod;

(d) said lower section of said upper plug portion and said middle segment of said lower plug portion having complementarily threaded means defined thereon for rigidly threadably attaching said upper and lower plug portions to one another;

(e) said middle section of said upper plug portion and said upper segment of said lower plug portion having complementary interlocking means defined thereon for locking said upper and lower plug portions together so as to resist unthreading of said upper and lower plug portions from one another.

4,888,152

FUEL ASSEMBLY GRID FOR LIGHT WATER REACTOR

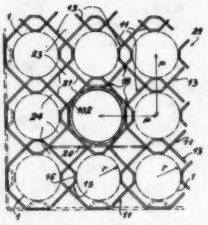
Lioka Razafindrazaka, Montigny le Bretonneux, France, assignor to Commissariat A L'Energie Atomique, Paris, France

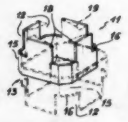
Filed Jan. 20, 1988, Ser. No. 146,215

Claims priority, application France, Jan. 21, 1987, 87 00660

Int. Cl.[4] G21C *3/34*

U.S. Cl. 376—462 **8 Claims**





1. A grid for assembling a plurality of nuclear fuel rods, comprising a plurality of cylinder portions and means for joining said cylinder portions in a parallel array, wherein each of said cylinder portions has a substantially polygonal cross section comprising a plurality of sides connected by a corresponding plurality of flat portions, each one of said fuel rods being encompassed by a corresponding one of said cylinder portions, each cylinder portion having a plurality of cut-outs, each cut-out extending over a corresponding part of the height of said cylinder portion and having a flat portion of a different cylinder portion inserted therein, whereby each of said nuclear fuel rods not arranged on the periphery of said grid bears against a flat portion of each of a predetermined number of said cylinder portions, but does not bear against any portion of the cylinder portion encompassing the respective fuel rod.

4,888,153

FE-BASE BUILD-UP ALLOY EXCELLENT IN RESISTANCE TO CORROSION AND WEAR

Ritsue Yabuki, and Saburo Wakita, both of Omiya, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 219,694
Claims priority, application Japan, Jul. 16, 1987, 62-175912
Int. Cl.[4] C22C *38/58, 38/38*
U.S. Cl. 420—57 3 Claims

1. An Fe build-up alloy excellent in resistance to corrosion and wear, consisting essentially of in weight percent:

C: from 0.005 to 1.6%,
Mn: from 4 to 28%,
Cr: from 12 to 36%,
Mo: from 0.01 to 9%,
Hf: from 0.005 to 15%,
N: from 0.01 to 0.9%, and

further containing:

Si: from 0 to 5%,
Ni: from 0 to 30%, and

one or both of:

Nb and W: from 0 to 6%, and

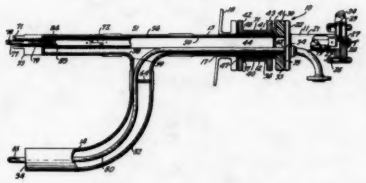
the balance being Fe and incidental impurities.

4,888,154

COMBINATION STRUCTURE FOR SAMPLING THE CONTENTS OF A REACTOR VESSEL INCLUDING PH MONITORING MEANS

Michael Sheridan, Old Bridge, N.J., assignor to Ethylene Corp., Murray Hill, N.J.

Filed Mar. 6, 1987, Ser. No. 23,114
Int. Cl.[4] G01N *1/14, 27/56*
U.S. Cl. 422—49 3 Claims



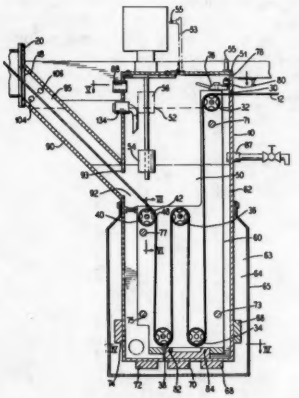
1. A combination structure for installation within a reactor vessel for sampling the reacting contents of the vessel and continuous monitoring of the pH factor of said contents, said structure comprising: an outer housing element, a vessel engaging element, and an inner baffle element; said inner baffle element being of "h" tubular configuration, and including a rectilinear leg and a curvilinear leg, said rectilinear leg having an outer end projecting through an opening in said vessel, said vessel engaging element engaging said outer end and maintaining said outer ends in fixed condition relative to said opening, said outer housing element being mounted upon said vessel engaging element; a fluid sampling conduit carried within said curvilinear leg, an inner end of which is positioned to lie within a reacting mass in said vessel, and an outer end of which is adapted to communicate with suction means; a pH monitoring means including a rectilinear tube disposed within said rectilinear leg, and having an inner end positioned to lie within said reacting mass, and an outer end extending outwardly through said opening in said vessel; an elongated linkage positioned within said rectilinear tube and having an inner end adjacent said inner end of said tube and an outer end projecting outwardly of said outer end of said tube; and a pH monitoring probe carried by said inner end of said linkage and electrically communicating with said outer end of said linkage.

4,888,155

APPARATUS FOR STERILIZING FILM AND LIKE PACKAGING MATERIAL

John L. Posey, McHenry, and Ronald W. Swank, Crystal Lake, both of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Filed Apr. 7, 1987, Ser. No. 35,686
Int. Cl.[4] A61L *2/18*
U.S. Cl. 422—49 11 Claims



1. An apparatus for sterilizing and cleaning packaging material comprising:

a container for containing a liquid sterilant bath through which packaging material is drawn and guided, the container having an entry opening, an exit opening, and means for guiding the packaging material through the liquid sterilant bath;

at least one spray nozzle located at a position above the level of the liquid sterilant for spraying the packaging material with recirculated filtered liquid sterilant after the packaging material has been drawn through the liquid sterilant in the bath to remove residue particulate from the packaging material;

conduit means for providing a hydrolock between the container and an environment into which the packaging material is being fed, the hydrolock being so constructed and arranged so that it receives a portion of the liquid sterilant, the spray nozzle being located in the hydrolock, the conduit means extending from the container to the environment into which the packaging material is being fed, and having an inlet opening secured to an exit opening of the container and an outlet opening in fluid communication with the environment, the conduit extending from a side of the container at an acute angle, the container including a wall that extends across a portion of the inlet; and

a liquid sterilant level in the container being at least higher than a lower end of the wall and a liquid sterilant level in the conduit being lower than the spray nozzle.

4,888,156

FLUID CATALYTIC CRACKING UNIT REGENERATION HAVING INTERNAL COOLING MEANS

Tiffin E. Johnson, Macungie, Pa., assignor to Houdry Process Corporation, Allentown, Pa.

Filed Apr. 29, 1988, Ser. No. 188,242
Int. Cl.[4] F27B *15/16, 15/10*
U.S. Cl. 422—144 5 Claims

1. A fluidized bed catalyst regenerator suited for the oxidation of coke deposited on a spent catalyst from a catalytic

cracking unit and thereby producing a regenerated catalyst, said regenerator comprising:

an inlet for spent catalyst;

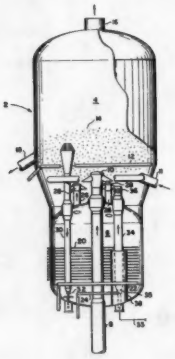
an upper combustion zone wherein coke contaminated catalyst is introduced for purposes of oxidizing coke deposited on said catalyst;

air distribution means for fluidizing and oxidizing coke on said catalyst in said upper combustion zone;

a flue gas outlet for removing flue gas from said upper combustion zone;

a lower cooling zone established within said regenerator and below said upper combustion zone containing means for reducing the temperature of hot catalyst formed in the upper combustion zone;

gas distribution means for maintaining the catalyst in a fluidized state in said lower cooling zone;



a first substantially vertically extending conduit communicating between said upper combustion zone and said lower cooling zone for transporting hot catalyst from said upper combustion zone to said lower cooling zone;

a second substantially vertically extending conduit communicating between said upper combustion zone and said lower cooling zone for transporting cooled catalyst to the upper combustion zone;

fluidization means associated with said second substantially vertically extending conduit for maintaining and transporting the cooled catalyst in fluidized state to said upper combustion zone;

means separate from said second conduit communicating between said upper combustion zone and said lower cooling zone for transporting fluidizing gas utilized in the lower cooling zone to the upper combustion zone; and

a regenerated catalyst conduit.

4,888,157

SULPHUR COMPOUNDS REMOVAL

Peter J. H. Carnell, Cleveland, and Patrick J. Denny, Darlington, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation-in-part of Ser. No. 39,070, Apr. 16, 1987, abandoned. This application Jun. 15, 1988, Ser. No. 206,729

Claims priority, application United Kingdom, Jun. 17, 1987, 8714232

Int. Cl.[4] C01B *17/16, 31/20, 17/00;* **B01J** *8/00*

U.S. Cl. 423—230 **11 Claims**

1. In a process for the removal of sulphur compounds from a sulphur compound-containing fluid stream comprising at least 0.1% by volume of carbon dioxide, wherein said sulphur compounds are selected from the group consisting of carbonyl sulphide, mercaptans, and hydrogen sulphide, which process comprises passing said fluid stream, at a temperature below 100° C., through a bed of absorbent capable of absorbing said sulphur compounds, the improvement comprising using said absorbent in the form of unreduced agglomerates,

said agglomerates having:

a size in the range 1 to 10 mm;

a BET surface area when calcined of at least 80 $m^2.g^{-1}$;

a calcined density of not more than 1.5 $g.cm^{-3}$;

and said agglomerates comprising:

at least one copper compound; and

at least one element A compound, wherein element A is selected from the group consisting of zinc, aluminum, silicon, and metals of Groups IIIA, IVA, VA, VIA, and VIIA of the Periodic Table;

said copper compound and said element A compound being in a form selected from the group consisting of oxides, hydroxides, carbonates and basic carbonates, and being present in such proportions that:

the number of copper atoms form 30–97% of the total number of copper and said element A atoms in said agglomerates; and

after ignition of said agglomerates at 900° C., thereby forming ignited agglomerates, the content of cupric oxide plus any zinc oxide present in said ignited agglomerates is at least 70% by weight.

4,888,158

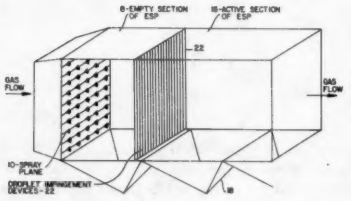
DROPLET IMPINGEMENT DEVICE

William Downs, Alliance, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Oct. 24, 1988, Ser. No. 261,456

Int. Cl.[4] C01B *17/00*

U.S. Cl. 423—242 **15 Claims**



1. A method for removing SO_x and particulates from a flue gas stream containing unevaporated droplets, comprising the steps of:

providing an electrostatic precipitator in the flue gas stream with the electrostatic precipitator having at least one field of electrical components removed therefrom;

arranging a bank of atomizers in the electrostatic precipitator in the field without the electrical components;

spraying an alkaline sorbent into the flue gas stream with the bank of atomizers;

situating at least two rows of a plurality of impingement members downstream of the atomizers and upstream of the electrical components in a staggered array in a plane normal to the flue gas stream so that the gas stream passes therethrough;

drying the impinging droplets on the impingement members to form friable deposits; and

removing the friable deposits from the impingement members

4,888,159

PROCESS FOR THE PREPARATION OF SILICON OXYNITRIDE-CONTAINING PRODUCTS

Peter W. Lednor, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed May 4, 1988, Ser. No. 190,911
Claims priority, application Netherlands, May 6, 1987, 8701065
Int. Cl.[4] C04B *35/58*
U.S. Cl. 423—325 5 Claims

1. A process for the preparation of silicon oxynitride (Si_2N_2O) containing products in which silicon dioxide is converted with ammonia while being heated, which process comprises reacting an amorphous, non-porous silicon dioxide material with flowing, ammoniacontaining gas at a temperature ranging from about 950° C. to about 1300° C.

4,888,160

PROCESS FOR PRODUCING CALCIUM CARBONATE AND PRODUCTS THEREOF

John A. Kosin, Bel Air, and Claude R. Andrews, Pasadena, both of Md., assignors to J.M. Huber Corporation, Rumson, N.J.

Continuation-in-part of Ser. No. 811,230, Dec. 20, 1985, abandoned. This application May 8, 1987, Ser. No. 47,318
Int. Cl.[4] C01F *5/24, 11/18*
U.S. Cl. 423—430 20 Claims

1. A method for producing calcium carbonate, comprising the steps of:

(a) providing an aqueous calcium hydroxide slurry in a reaction vessel;

(b) continuously recirculating at least a portion of the aqueous slurry through a recycle piping system in communication with the reaction vessel; and

(c) injecting a gas comprising carbon dioxide into the recirculating aqueous slurry at a turbulent area located in the recycle piping system until the pH of the aqueous slurry in the reaction vessel is in the approximate range of from 8 to 10, at which time the gas injection is discontinued.

4,888,161

METHOD OF FORMING DENSE, UNSINTERED, GRANULAR ALKALINE EARTH METAL CARBONATES

Charles Adams, Jr., and Jerry A. Cook, both of Cartersville, Ga., assignors to Chemical Products Corporation, Cartersville, Ga.

Continuation-in-part of Ser. No. 7,588, Jan. 28, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 223,386
Int. Cl.[4] C01F *11/18*
U.S. Cl. 423—430 26 Claims

1. A method of converting precipitated alkaline earth metal carbonate selected from the group consisting of strontium carbonate and barium carbonate into a granular form suitable for use in a feedstock to a glass furnace, comprising the steps of

(a) forming a suspension of the precipitated carbonate in water containing a water-soluble deflocculating agent that dissolves in molten glass without causing defects in the glass, said suspension containing at least about 35 volume percent of the carbonate and sufficient deflocculating agent to substantially completely deflocculate the carbonate;

(b) drying the resultant suspension at an elevated temperature so as to produce a substantially dry, granular product, at least about 80 weight percent of which has a particle size passing 10 mesh but not 150 mesh (Tyler), said drying being conducted without allowing the product to reach 400° C.; and

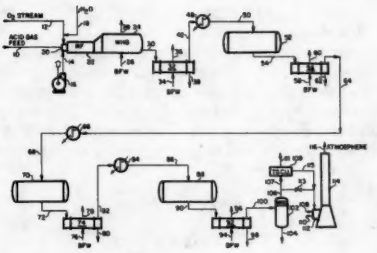
(c) heating the resultant granular product in a zone maintained at a temperature in the range of about 600° to 700° C. for a time long enough to increase the loose bulk density of the granular product by at least about 5 percent, but not for so long a time as to cause the product to sinter.

4,888,162

TEMPERATURE MODERATION WITH WATER OF AN OXYGEN ENRICHED CLAUS SULFUR PLANT

Barry W. Brian, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jul. 3, 1984, Ser. No. 627,379
Int. Cl.[4] C01B *17/04*
U.S. Cl. 423—574 R 7 Claims



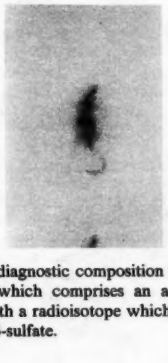
1. In a process for recovering sulfur from a feed gas stream containing 60–100 mole% hydrogen sulfide wherein the gas stream is partially combusted with oxygen-enriched air in a Claus reaction furnace zone, a combustion effluent is cooled with the attendant condensation separation of sulfur in a condensation zone and the remaining effluent stream is further treated, the improvement comprising oxygen enriching the combustion in the range of 32–100 mole% oxygen and introducing a moderating stream of added liquid water into the reaction furnace zone in order to moderate the temperature of the reaction furnace zone in the range of 2400° to 2800° F.

4,888,163

DIAGNOSTIC AGENT FOR BREAST CANCER OR TUMOR

Akiko Kubodera, Chiba; Touichi Tanaka, and Yukimichi Komori, both of Tokyo, all of Japan, assignors to Nihon Medi-Physics Co., Ltd., Hyogo, Japan

Filed Jan. 25, 1989, Ser. No. 301,134
Claims priority, application Japan, Jan. 29, 1988, 63-20379
Int. Cl.[4] A61K *49/02;* G01N *33/53*
U.S. Cl. 424—1.1 5 Claims



1. A radioactive diagnostic composition for imaging breast cancer or tumor, which comprises an anti-estriol-3-sulfate antibody labeled with a radioisotope which composition does not contain estriol-3-sulfate.

4,888,164
COSMETIC COMPOSITION FOR THE TREATMENT OF OILY SKIN AND HAIR BASED ON DI(BETA-HYDROXYETHYL) SULFOXIDE AND THE USE THEREOF

Jean-Francois Grollier, Paris, and Jean Maignan, Tremblay Les Gonesse, both of France, assignors to L'Oreal, Paris, France

Filed Dec. 22, 1986, Ser. No. 944,166
Claims priority, application Luxembourg, Dec. 27, 1985, 86229
Int. Cl.[4] A61K 7/48, 7/06, 7/075
U.S. Cl. 424—63 1 Claim

1. A process for improving the appearance of the hair or skin of persons having oily hair or oily skin comprising applying to said oily hair or oily skin, in an amount effective to improve the appearance thereof, a cosmetic composition comprising in a cosmetically acceptable vehicle an amount of di(β-hydroxyethyl) sulfoxide effective to combat the oily appearance of the hair or skin.

4,888,165
PROCESS FOR THE REDUCTION OF NITROGEN OXIDES IN AN EFFLUENT USING A HETEROCYCLIC HYDROCARBON

William R. Epperly, New Canaan, and James C. Sullivan, Southport, both of Conn., assignors to Fuel Tech, Inc., Stamford, Conn.

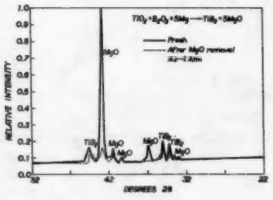
Continuation of Ser. No. 25,493, Mar. 13, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,736
Int. Cl.[4] C01B 21/00; B01J 8/00
U.S. Cl. 423—235 25 Claims

1. A process for the reduction of the concentration of nitrogen oxides in the effluent from the combustion of a carbonaceous fuel, the process comprising injecting a treatment agent which comprises furfural into the effluent under conditions effective to reduce the concentration of nitrogen oxides in the effluent.

4,888,166
PROCESS FOR MAKING HIGHLY REACTIVE SUB-MICRON AMORPHOUS TITANIUM DIBORIDE POWDER

Kathryn V. Logan, Roswell, assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Sep. 3, 1986, Ser. No. 903,265
Int. Cl.[4] C01B 35/04
U.S. Cl. 423—297 13 Claims

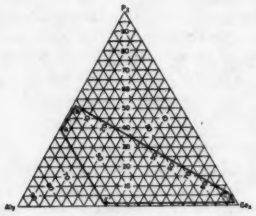


1. The method of making sub-micron titanium diboride which comprises the steps of forming a powdered reaction mixture consisting essentially of titanium oxide, boron oxide and magnesium, exothermically reacting the reaction mix in an atmosphere including air to yield a reacted mass containing titanium diboride and magnesia, and leaching the reacted mass with a leaching solution having a pH in the range of about 0.5 to about 8, to recover the sub-micron titanium diboride.

4,888,167
GERMANIUM-ALUMINUM-PHOSPHORUS-OXIDE MOLECULAR SIEVE COMPOSITIONS

Edith M. Flanigen, White Plains; Brent M. T. Lok, New City; Robert L. Patton, Katonah, and Stephen T. Wilson, Shrub Oak, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 599,807, Apr. 13, 1984, abandoned. This application Mar. 20, 1986, Ser. No. 841,753
Int. Cl.[4] C01B 25/26
U.S. Cl. 423—306 28 Claims



1. A crystalline molecular sieve having a three-dimensional microporous framework structure of GeO_2, AlO_2 and PO_2 tetrahedral units having an empirical chemical composition of an anhydrous basis expressed by the formula:

$$mR:(Ge_xAl_yP_z)O_2$$

wherein "R" represents at least one organic templating agent present in the in-tracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Ge_xAl_yP_z)O_2$ and has a value of zero to about 0.3; and "x", "y" and "z" represent the mole fractions of germanium, aluminum and phosphorous, respectively, present as tetrahedral oxides, said fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables C, F, J, N, P, U and V;

TABLE C

	(GeAPO-14)	
2θ	d(Å)	Relative Intensity
8.6–8.9	10.39–9.93	vs
13.0	6.81	w
21.9–22.2	4.06–4.00	w
25.4	3.51	w
27.5	3.24	w
29.7	3.01	w

TABLE F

	(GeAPO-18)	
2θ	d(Å)	Relative Intensity
9.6–9.7	9.21–9.11	vs
15.5–15.6	5.72–5.70	w–m
16.9–17.1	5.25–5.19	m
20.15–20.25	4.41–4.39	m
20.95–21.05	4.24–4.22	w–m
31.8–32.6	2.814–2.75	m

TABLE J*

	(GeAPO-33)	
2θ	d(Å)	Relative Intensity
9.25–9.55	9.56–9.26	w–m
12.5–12.9	7.08–6.86	vs
15.3	5.79	w
26.05–26.35	3.42–3.38	w–m

TABLE J*-continued

2θ	(GeAPO-33) d(Å)	Relative Intensity
27.3–27.6	3.27–3.23	vs
40.0	2.25	w

*as synthesized form

TABLE N

2θ	(GeAPO-36) d(Å)	Relative Intensity
7.7–7.9	11.5–11.2	vs
16.2–16.6	5.47–5.34	w–m
18.9–19.3	4.70–4.60	m–s
20.6–20.8	4.31–4.27	w–s
21.8–22.0	4.08–4.04	m
22.2–22.5	4.00–3.95	w–m

TABLE P

2θ	(GeAPO-39) d(Å)	Relative Intensity
9.4–9.6	9.41–9.21	w–m
13.3–13.6	6.66–6.51	m–vs
18.0–18.4	4.83–4.02	m
21.2–21.5	4.19–4.13	m–s
22.5–23.0	3.95–3.87	s–vs
30.2–30.5	2.96–2.93	w–m

TABLE U

2θ	(GeAPO-46) d(Å)	Relative Intensity
7.2–8.1	12.3–10.9	vs
21.2–21.8	4.19–4.08	w–m
22.5–23.0	3.95–3.8	vw–m
26.6–27.2	3.351–3.278	vw–w
28.5–29.0	3.132–3.079	vw–w

TABLE V

2θ	(GeAPO-47) d(Å)	Relative Intensity
9.4	9.41	vs
15.9–16.0	5.57–5.54	w–m
20.5–20.6	4.33–4.31	s
24.5–24.7	3.63–3.60	w
25.8–25.9	3.45–3.44	w
30.4–30.5	2.940–2.931	w

4,888,168

STABLE OPHTHALMIC PREPARATIONS CONTAINING ACETAZOLAMIDE

Angela C. Potts, and Mark Gibson, both of Hampshire, England, assignors to American Cyanamid Company, Wayne, N.J.

Filed Dec. 2, 1987, Ser. No. 127,847

Claims priority, application United Kingdom, Mar. 2, 1987, 8704810

Int. Cl.[4] A61K *31/74, 31/745;* **A01N** *43/82*

U.S. Cl. 424—78 **12 Claims**

1. A stable, ophthalmic aqueous composition for topical administration, comprising (a) acetazolamide and either (b) a pre-formed, pharmaceutically acceptable, aqueous gel or (c) an aqueous gel-forming liquid capable of forming a pharmaceutically acceptable gel in situ when applied topically to a patient; said composition having a pH of less than 5.0.

4,888,169

BORDETELLA BRONCHISEPTICA VACCINE

Albert L. Brown; Joseph C. Franz, and Richard H. Peetz, all of Lincoln, Nebr., assignors to Norden Laboratories, Inc., Lincoln, Nebr.

Continuation of Ser. No. 918,424, Oct. 14, 1986, abandoned. This application Nov. 9, 1988, Ser. No. 270,428

Int. Cl.[4] A61K *39/02, 39/12, 39/38*

U.S. Cl. 424—92 **16 Claims**

1. A vaccine for protecting a canine animal against disease caused by *Bordetella bronchiseptica* which comprises a vaccinal amount of whole *Bordetella bronchiseptica* cells which have been inactivated by treatment with glutaraldehyde.

4,888,170

VACCINES OBTAINED FROM ANTIGENIC GENE PRODUCTS OF RECOMBINANT GENES

Roy Curtiss, III, St. Louis, Mo., assignor to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 314,030, Oct. 22, 1981, abandoned. This application Sep. 9, 1985, Ser. No. 773,894

Int. Cl.[4] C12N *1/20, 1/42;* **A61K** *39/112, 39/09*

U.S. Cl. 424—93 **10 Claims**

1. A vaccine for the immunization of a vertebrate comprising:

an avirulent derivative of a pathogenic microbe of the genus Salmonella or which is a Salmonella-Escherichia hybrid that expresses a recombinant gene derived from a pathogen of said vertebrate of the species *Streptococcus mutans* to produce an antigen capable of inducing an immune response in said vertebrate against said pathogen.

4,888,171

GRANULAR PRODUCT OF DRIED MICROORGANISM CELLS AND MANUFACTURING METHOD THEREFOR

Shigeo Okonogi, Ohta; Mamoru Tomita; Seiichi Shimamura, both of Yokohama; Norio Ishibashi, Tokyo, and Tsutomu Kudo, Yokohama, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan

Filed Apr. 11, 1985, Ser. No. 722,106

Claims priority, application Japan, Apr. 18, 1984, 59-76622

Int. Cl.[4] A01N *63/00;* **A23C** *9/12;* **C12N** *1/04*

U.S. Cl. 424—93 **5 Claims**

1. A granular product containing dried viable bacterial cells consisting of 1 to 80% by weight of a core material and 20 to 99% by weight of an adherent composition, the adherent composition comprising at least 5% by weight of a binding material containing substantially no water having a melting point of 25° to 60° C. and less than 95% by weight of dried viable bacterial cells selected from the genera Bifidobacterium and lactic acid Streptococcus, and having smooth spheres of a stratified structure of said adherent composition surrounding said core material.

4,888,172

PHARMACEUTICAL FOR TREATING TUMORS AND METHODS FOR MAKING IT

Emil Szebenyi, Little Falls, and Shogen Kuslima, Somerset, both of N.J., assignors to Alfacen Corporation, Bloomfield, N.J.

Continuation-in-part of Ser. No. 643,808, Aug. 23, 1984, abandoned, which is a continuation of Ser. No. 422,034, Sep. 23, 1982, abandoned. This application Sep. 17, 1985, Ser. No. 776,798

Int. Cl.[4] A61K *35/54*

U.S. Cl. 424—105 **17 Claims**

1. A pharmaceutical for treating tumors, comprising a biologically active extract derived from fertilized eggs of a frog species.

9. A method of manufacturing a pharmaceutical for treating tumors, comprising the following steps:

(a) creating embryos of the *Rana pipiens* frog;

(b) terminating development of the embryos prior to gastrulation;
(c) mechanically processing the embryos to derive an extract therefrom;
(d) detoxifying the extract; and
(e) diluting the detoxified extract to a standard therapeutic potency.

4,888,173

ANTHOCYANIN BIRD REPELLENTS

James R. Mason, Philadelphia, Pa., and Michael A. Adams, Haddonfield, N.J., assignors to Monell Chemical Senses Center, Philadelphia, Pa.

Filed Jun. 12, 1987, Ser. No. 62,219
Int. Cl.[4] A61K 35/78, 31/35
U.S. Cl. 424—195.1 19 Claims

1. A method for reducing the amount of a composition lost to avian consumption comprising incorporating into or applying to said composition an effective avian repellent amount of one or more anthocyanins.

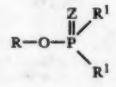
4,888,174

INSECTICIDAL POLYMERIC COMPOSITIONS

Richard A. Farquharson, Houston, and Edwina B. Mitchell, Pearland, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 110,236, Oct. 19, 1987, abandoned, which is a continuation-in-part of Ser. No. 945,424, Dec. 22, 1986, abandoned. This application Jul. 18, 1988, Ser. No. 220,185
Int. Cl.[4] A01N 25/00, 25/34, 57/00; A61K 31/74
U.S. Cl. 424—405 4 Claims

1. A method for retarding the migration of an O-pyridyl phosphate insecticide of the formula



wherein

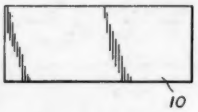
R represents halopyridyl, Z represents a member of the group consisting of oxygen and sulfur, and R^1 represents a member of the group consisting of lower alkoxy, amino and lower akylamino from a low density polyethylene matrix which comprises incorporating into the matrix an ethylene copolymer having at least one comonomer which is an unsaturated 3 to 5 carbon atom carboxylic acid, salt or ester thereof present in a concentration of from about 0.5 to about 20 weight percent of the total composition.

4,888,175

ASEPTIC PACKAGING

Kenneth R. Burton, Jr., 1327 Emerald Green Blvd., Houston, Tex. 77094, and Charles B. Turner, 19418 Leafwood, Houston, Tex. 77084

Filed Nov. 14, 1988, Ser. No. 270,947
Int. Cl.[4] A01N 43/38, 43/56
U.S. Cl. 424—409 6 Claims



1. An aseptic package of a plant with soil and root structure susceptible to bacterial or viral infection,

said plant having its soil and root structure enclosed in a sheet of a plastic packaging material formed into an open top container having a biocidal agent dissolved or dispersed in said sheet in solution in or in combination with a plasticizer for said plastic sheet, in an amount from 0.001 to 5.0% by weight of said plastic,

said biocidal agent comprising 10,10-oxybisphenoxarsine or a biocidal derivative or analog thereof, in an amount sufficient to inhibit biocidal activity on and throughout soil and root structure over an extended period of storage.

4,888,176

CONTROLLED DRUG DELIVERY HIGH MOLECULAR WEIGHT POLYANHYDRIDES

Robert S. Langer, Sommerville; Abraham J. Domb, Brookline, and Cato T. Laurencin, Cambridge, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 613,001, May 21, 1984, and a continuation-in-part of Ser. No. 49,988, May 15, 1987, abandoned, which is a continuation-in-part of Ser. No. 892,809, Aug. 1, 1986, said Ser. No. 613,001, is a continuation of Ser. No. 477,710, Mar. 22, 1983, abandoned. This application Jun. 12, 1987, Ser. No. 61,294
The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.
Int. Cl.[4] A61K 31/74
U.S. Cl. 424—426 18 Claims

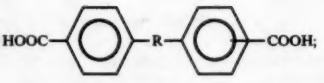
1. A bioerodible controlled drug release device comprising a homogeneous polymeric matrix of:

(a) an effective amount of at least one biologically active substance, and;

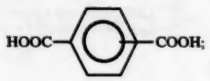
(b) a high molecular weight hydrophobic polyanhydride copolymer having a weight average molecular weight greater than 20,000 and an intrinsic viscosity greater than 0.3 dl/in chloroform at 23° C., said polyanhydride produced from at least one dicarboxylic acid selected from the group consisting of:

aliphatic dicarboxylic acids having the formula:

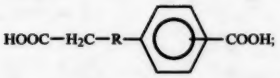
aromatic dicarboxylic acids having the formula:



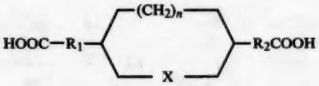
aromatic dicarboxylic acids having the formula:



aliphatic-aromatic dicarboxylic acids having the formula:



aromatic and aliphatic heterocyclic dicarboxylic acids having the formula:



wherein

X is selected from the group consisting of oxygen, nitrogen, and sulfur, and

n is an integer between 1 and 3; and

aromatic and aliphatic heterocyclic dicarboxylic acids of the above formula in combination with at least one dicarboxylic acid selected from the group consisting of aliphatic dicarboxylic acids, aromatic-aliphatic dicarboxylic acids, and aromatic dicarboxylic acids having more than one phenyl group;

wherein the R groups are divalent organic radical groups.

4,888,177

PHARAMACEUTICAL PREPARATIONS IN THE FORM OF INSTANT GRANULES OR TABLETS AND PROCESS FOR THEIR MANUFACTURE

Gerhard Gergely; Thomas Gergely, and Irmgard Gergely, all of Gartengasse 8, A-1050 Vienna, Austria

PCT No. PCT/EP85/00585, § 371 Date Jul. 2, 1986, § 102(e) Date Jul. 2, 1986, PCT Pub. No. WO86/02834, PCT Pub. Date May 22, 1986

PCT Filed Nov. 2, 1985, Ser. No. 887,808

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1984, 3440288

Int. Cl.[4] A61K *9/16, 9/46*

U.S. Cl. 424—466 **46 Claims**

1. A pharmaceutical preparation, consisting essentially of a granulated carbohydrate carrrier material, and

a coating layer adhering to each grain of said carrier material, said coating layer including at least one pharmaceutically active substance which is insoluble, sparingly soluble, or slowly soluble in water.

4,888,178

GALENIC FORMULATIONS WITH PROGRAMMED RELEASE CONTAINING NAPROXEN

Leone G. Rotini, Bologna, and Egidio Marchi, Casalecchio di Reno, both of Italy, assignors to Alfa Wassermann S.p.A., Bologna, Italy

Continuation of Ser. No. 73,581, Jul. 15, 1987, abandoned. This application Apr. 12, 1989, Ser. No. 336,507

Claims priority, application Italy, Jul. 23, 1986, 3467 A/86

Int. Cl.[4] A61K *9/24*

U.S. Cl. 424—468 **15 Claims**

1. A galenic formulation for oral administration having a programmed release and containing naproxen as an active ingredient, which is formed by a mixture comprising:

(a) a granulate having immediate release including from about 30% to about 70% by weight of the total amount of naproxen in said formulation in admixture with a binding agent, a disintegrating agent, and a lubricating agent; and

(b) a granulate having a controlled release including from about 30% to about 70% by weight of the total amount of naproxen in said formulation in admixture with hydrogenated castor oil and ethylcellulose as retarding agents.

4,888,179

DIURETIC COMPOSITION

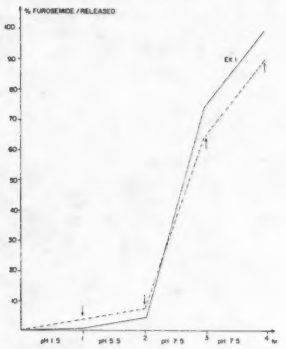
Curt H. Appelgren, Kungsbacka, and Eva C. Eskilsson, Mölnlycke, both of Sweden, assignors to Lejus Medical Aktiebolag, Mölndal, Sweden

Filed Jan. 15, 1988, Ser. No. 144,229

Claims priority, application Sweden, Jan. 15, 1987, 8700137

Int. Cl.[4] A61K *9/36*

U.S. Cl. 424—480 **15 Claims**



1. A multiple-unit dose composition comprising furosemide, N-(2-furfuryl)-4-chloro-5-sulfamoyl-antranilic acid, as pharmaceutically active compound, characterized in that the composition in a release test using Dissotest, 100 ml/hr, in an aqueous medium having pH 1.5 gives a release of furosemide of less than 4% during 1 hr, and in the same test in an aqueous medium having pH 5.5 gives a release of furosemide of less than or equal to 7.5% during a following hour, (hour 2), and in the same test, in an aqueous medium having pH 7.5 gives a release of furosemide of at least 65% during a further following hour, (hour 3), and in the same test in the same aqueous medium having pH 7.5 gives a release of furosemide of at least 90% during a further following hour, (hour 4).

4,888,180

A METHOD OF PREPARING GRAIN CAKES

Rei-Young Wu, Palatine, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

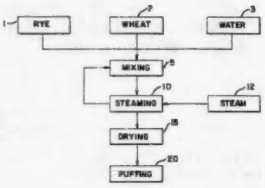
Filed Feb. 10, 1988, Ser. No. 154,683

Int. Cl.[4] A23L *1/18;* A23R *1/14*

U.S. Cl. 426—618 **21 Claims**

1. In a method for making a puffed, cake-shaped food product by heating a predetermined quantity of cereal grains in a hermetically sealed chamber at superatmospheric pressure and then expanding the heated grains while they are confined to the chamber by abruptly releasing the superatmospheric pressure such that the confined, expanded grains bond together to form a self-supporting mass wherein the improvement comprises pretreatment of the cereal grains by steaming cereal

grains to bring them to an effective temperature to partially gelatinize the starch therein and to maintain the cereal grains at the effective temperature for an effective period of time to produce a desired degree of expansion in the final product.



4,888,181

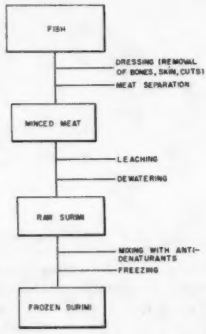
SEA FOOD FLAVORED FOOD PRODUCTS

Robert D. Gray, and Thomas J. Gray, both of Gloucester, Mass., assignors to Nu-C Products Inc., Gloucester, Mass.

Filed Apr. 23, 1987, Ser. No. 41,469

Int. Cl.[4] A23L *1/325;* **A23J** *1/04*

U.S. Cl. 426—643 **14 Claims**



1. Method for preparation of modified fish containing food products which includes the steps of mincing surimi seafood and adding thereto a small proportion up to 50% by weight of previously processed dehydrated fish concentrate consisting of dry, storable, dehydrated fibrous fish product produced by mincing followed by a one-step controlled dehydration under reduced pressure and absence of oxidizing atmosphere and temperatures up to 95° C.

4,888,182

COMPOSITIONS AND METHODS OF TREATING CALCIUM RENAL STONES

Charles Y. C. Pak, Dallas, Tex., assignor to Board of Regents of the University of Texas System, Austin, Tex.

Continuation-in-part of Ser. No. 741,715, Jun. 6, 1985, abandoned, which is a continuation of Ser. No. 483,678, Apr. 11, 1983, abandoned. This application Feb. 26, 1987, Ser. No. 19,056

Int. Cl.[4] A61K *31/14*

U.S. Cl. 424—677 **13 Claims**

1. A method for prevention of calcium renal stone formation in a patient susceptible to such stone formation and for dissolution of calcium renal stones and prevention of further calcium renal stone formation in a patient afflicted with calcium renal stones, the method comprising:

administering the patient a daily oral dosage of a composition consisting essentially of potassium citrate, the daily oral dosage containing potassium citrate in an amount between about 30 meq and about 120 meq.

4,888,183

FERMENTED MILK

Tsutomu Kondou, Sagamihara, Japan, assignor to Mitsubishi Kasei Corporation and Nikken Chemicals Company, Limited, both of, Japan

Filed Jul. 25, 1988, Ser. No. 223,893

Claims priority, application Japan, Jul. 28, 1987, 65-188485

Int. Cl.[4] A23C *9/13;* **A23L** *1/236, 1/20*

U.S. Cl. 426—34 **4 Claims**

1. A fermented milk comprising 10 to 20% by weight of mesoerythritol.

4,888,184

DECOLORISING OF WHEY AND PRODUCTS DERIVED FROM WHEY

Robin C. Bottomley, Bucks; Robert D. Colvin, South Harrow, both of England, and Madison Van Blanton, Louisville, Ky., assignors to Express Foods Group Limited, Middlesex, England

Filed Mar. 19, 1987, Ser. No. 27,909

Int. Cl.[4] A23C *21/02, 21/08;* **A23L** *1/015*

U.S. Cl. 426—41 **22 Claims**

1. A method of decolorizing annatto-containing whey or annatto-containing products derived from whey by an enzyme catalyzed oxidation reaction with hydrogen peroxide, comprising oxidizing said annatto with hydrogen peroxide in the presence of a catalytic amount of an active peroxidase, said peroxidase being present throughout the entire oxidation of the annatto, in which the amount of hydrogen peroxide used is sufficient to effect the oxidation of at least some of the annatto present in the whey or whey derived product in order to obtain the desired decolorizing and which amount is dependent upon the protein concentration in the whey with increased quantities of protein permitting higher amounts of hydrogen peroxide to be used and in which any deactivating amount of hydrogen peroxide initially present is removed by reaction with other materials in the whey leaving an adequate amount to do the decolorizing.

4,888,185

ANIMAL FEED SUPPLEMENT SUSPENSION

Alex E. Miller, Placentia, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jun. 27, 1986, Ser. No. 879,595

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—72 **40 Claims**

1. An alkaline animal feed supplement composition consisting essentially of an aqueous suspension of the components:

Component	Weight Percent
Water	About 20 to about 40
Sodium carbonate	About 2 to about 10
Calcium phosphate	About 2 to about 10
Nutritious by-product liquor	About 10 to about 40
Limestone	About 5 to about 30

and a suspending agent which is either: (a) at least about 0.05 percent by weight of a gum or (b) at least about 0.5 percent by weight of a clay, the feed supplement composition having a pH at least about 9 and being capable of remaining fluid upon standing for at least 17 days.

4,888,186

METHOD FOR PRODUCING FLAVORED POPCORN

Judith Cooley, Schaumburg, Ill., and Diane Douglas, Norwell, Mass., assignors to Brady Enterprises Inc., E. Weymouth, Mass.

Filed Apr. 5, 1988, Ser. No. 177,762
Int. Cl.[4] A23D 5/00; A23L 1/18
U.S. Cl. 426—99 12 Claims

1. A method for applying flavoring to a food comprising:
preparing a fat-flavor system in particulate form by dry-blending solid particles of an edible, metabolizable fat with a flavoring wherein said fat particles have a melting point of no less than about 95° F.;
processing a base food to a temperature of at least about 95° F.;
applying the fat-flavor system to the base food while at said temperature; and
maintaining said fat-flavor system in contact with said base food for a time sufficient to permit at least a portion of said fat to melt and adhere the flavoring to said base food.

4,888,187

FRUIT-CONTAINING CONFECTIONERY BAR

Peter S. Given, Jr., Verona, and Henry Arciszewski, Franklin Lakes, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jul. 6, 1988, Ser. No. 215,496
Int. Cl.[4] A23G 3/00
U.S. Cl. 426—102 15 Claims

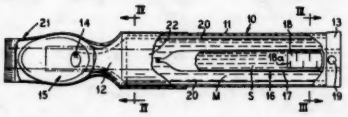
1. A fruit-containing confectionery product that has a water activity level of less than about 0.50 comprising a high solids content fruit core having a water activity level of less than about 0.65; said fruit core being encapsulated in a barrier caramel layer having a water activity level of less than about 0.50; nuts being embedded in said barrier caramel layer, and the foregoing being enrobed in a coating which covers said nuts and caramel.

4,888,188

DISPOSABLE FOOD FEEDER PACKAGE

John F. Castner, Sr., 1696 W. Mill St., #4, Colton, Calif. 92324, and John F. Castner, Jr., 1507 Indian Trail, San Bernardino, Calif. 92407

Filed May 9, 1988, Ser. No. 191,356
Int. Cl.[4] B65D 17/50, 53/08, 85/72, 37/00
U.S. Cl. 426—109 7 Claims



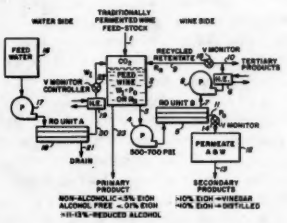
1. A single use disposable food feeder package comprising an elongated squeeze tube and a flowable food material contained therein, said squeeze tube being squeezable to collapse the tube and extrude said food material, said squeeze tube having a stiff hollow neck at one end thereof with a rigid food handling implement selected from the group consisting of a spoon, a fork, and a knife integral with and projecting therefrom, and a stiff rigid transverse seal on the other end of the tube, a pair of diametrically opposed stiff longitudinal ribs connecting the neck and seal and configured and arranged sufficient to hold the tube in an elongated unfolded condition when the tube is squeezed sufficient to provide a handle for said implement, a shrink wrap plastic sheath covering and sealing said stiff hollow neck and said implement, a plug closing said hollow neck for sealing the contents of the tube, and said sheath having a portion carrying said plug whereby removal of the sheath pulls the plug out of the neck and separates the sheath from the neck and implement for discharge of the flowable food material through the neck onto the implement when the tube is squeezed.

4,888,189

SIMULTANEOUS DOUBLE REVERSE OSMOSIS PROCESS FOR PRODUCTION OF LOW AND NON-ALCOHOLIC BEVERAGES

Barry R. Gnekow, Los Gatos, Calif., assignor to Ariel Vineyards, Inc., San Jose, Calif.

Filed Aug. 17, 1987, Ser. No. 86,265
Int. Cl.[4] C12G 3/08
U.S. Cl. 426—231 10 Claims



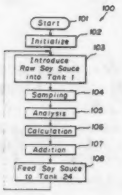
1. A method of reducing the alcohol content of a fermented alcoholic beverage comprising the steps of:
(a) withdrawing from a holding tank over a period of time an initial volume of fermented alcoholic beverage and subjecting said withdrawn beverage to a first reverse osmosis to produce beverage retentate and beverage permeate fractions;
(b) returning at least a portion of said beverage retentate fraction to said holding tank to mix with remaining beverage in said tank to produce an in-process beverage fraction in said holding tank;
(c) volumetrically monitoring the beverage permeate fractional removed;
(d) subjecting water to a second reverse osmosis to produce a purified permeate water fraction and a retentate water fraction;
(e) continuously adding said permeate water from said second reverse osmosis to said beverage in-process fraction in said holding tank in an amount substantially equal to said beverage permeate fraction, less an amount corresponding to beverage retentate not returned to said in-process beverage fraction, to maintain the volume of the remaining in-process beverage fraction in said tank substantially equal to said initial volume;
(f) subjecting said in-process beverage fraction to repeated passes through said first reverse osmosis step (a) and recycle step (b) while maintaining said first and second reverse osmosis for a period sufficient to reduce said alcohol content of said in-process beverage fraction to a desired level;
(g) monitoring the alcohol content of said in-process beverage fraction in said tank; and
(h) withdrawing a primary product beverage from said tank when said in-process beverage in said tank has had its alcohol content reduced to the desired reduced alcohol level.

4,888,190

METHOD OF MANUFACTURING SOY SAUCE

Hikotaka Hashimoto, and Kunio Kobayashi, both of Chiba, Japan, assignors to Kikkoman Corporation, Japan

Filed Mar. 25, 1988, Ser. No. 173,373
Claims priority, application Japan, Mar. 25, 1987, 62-68942
Int. Cl.[4] A23L *1/238;* G01N *33/02*
U.S. Cl. 426—231 **11 Claims**



1. A method of manufacturing soy sauce using an automatic controller comprising the steps of:

sampling a portion of a predetermined amount of raw soy sauce under control of the automatic controller;

simultaneously analyzing the concentrations of at least two ingredients of the sampled portion of the raw soy sauce selected from a group consisting of nitrogen, alcohol, glucose, sodium glutimate and salt by determining at least one light responsive characteristic of the sampled portion;

communicating the determined at least one light responsive characteristic to the automatic controller;

calculating in the automatic controller an amount to be added of at least two controlling ingredients selected from a group consisting of water, salt and alcohol in order to adjust the concentrations of said at least two analyzed ingredients to target values in response to analytic results from the analyzing step;

adding under control of the automatic controller the calculated amounts of said at least two controlling ingredients to said predetermined amount of raw soy sauce.

4,888,191

METHOD FOR DELAYING *CLOSTRIDIUM BOTULINUM* GROWTH IN FISH AND POULTRY

Robert J. Anders, Middleton; John G. Cerveny, and Andrew L. Milkowski, both of Madison, all of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Continuation of Ser. No. 120,769, Nov. 13, 1987, Pat. No. 4,798,729, which is a continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned. This application Dec. 20, 1988, Ser. No. 287,252
The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.
Int. Cl.[4] A23B *4/14*
U.S. Cl. 426—281 **11 Claims**

1. A method for delaying *Clostridium botulinum* growth in a foodstuff selected from the group consisting of fish and poultry, the method consisting essentially of:

(a) adding a lactate salt to a fresh foodstuff selected from the group consisting of fish and poultry, said lactate salt being added in an amount of about 1% to 7%;

(b) packaging the fresh foodstuff in a plastic barrier package; and

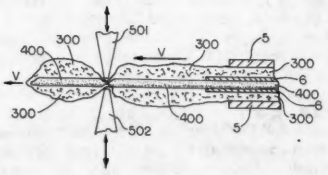
(c) cooking the foodstuff in said plastic barrier package to a temperature sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff.

4,888,192

METHOD FOR EXTRUSION OF BAKED GOODS

Wayne D. Ramnarine, Bergenfield, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 68,175, Jun. 30, 1987, abandoned, which is a division of Ser. No. 837,003, Mar. 5, 1986, Pat. No. 4,698,004. This application Jan. 12, 1989, Ser. No. 296,888
Int. Cl.[4] A23P *1/12, 1/14*
U.S. Cl. 426—448 **10 Claims**



1. A method of making a light, expanded center filled product comprising the steps of:

(a) selecting an expansible outer dough material and at least one essentially non-expandable filler material;

(b) simultaneously introducing said outer dough and filler material to an extrusion nozzle comprising a body receiving a first conduit defining an extrusion orifice for the outer dough and at least one second conduit adjustably disposed within the first conduit and defining an extrusion orifice for the filler material, said extrusion nozzle further including threaded adjustment screws to adjust the axial position of the second conduit with respect to the first conduit,

(c) adjusting the threaded adjustment screws to position said second conduit within the first conduit whereby said inner material is completely enrobed by the outer dough on extrusion;

(d) coextruding the outer dough and inner material to produce an extrudate having the filler material completely enrobed by the outer dough; and

(e) severing the extrudate into predetermined lengths.

4,888,193

BAKERY PRODUCTS AND NOODLES CONTAINING POLYGLUTAMIC ACID

Akira Konno, Osaka; Tetsuya Taguchi, Kakogawa, and Takenobu Yamaguchi, Akashi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 23, 1988, Ser. No. 172,193
Claims priority, application Japan, Mar. 24, 1987, 62-69805; Aug. 11, 1987, 62-201511
Int. Cl.[4] A21D *2/00, 13/00*
U.S. Cl. 426—549 **16 Claims**

1. Bakery products of the class consisting of bread and cake which comprises polyglutamic acid or an edible salt thereof in a proportion of about 0.03 to 0.5% (w/w) relative to wheat flour, wherein the polyglutamic acid has a molecular weight or about 10,000 or more as a sodium salt.

4,888,194

SHELF-STABLE ASEPTIC DAIRY PRODUCT

Delmar L. Andersen, Baldwinsville; David J. Keller, Syracuse, and Paul J. Streiff, Camillus, all of N.Y., assignors to Borden, Inc., Columbus, Ohio

Continuation of Ser. No. 940,095, Dec. 10, 1986, abandoned. This application Jun. 13, 1988, Ser. No. 207,912
Int. Cl.[4] A23C *13/14*
U.S. Cl. 426—570 **22 Claims**

1. A room temperature-stable aseptic dairy product which has been subjected to an ultra-high temperature sterilization treatment and which is capable of forming a stable foam upon

whipping, having a fat content of about 30% to about 40% by weight, comprising:

(a) about 90% to about 99.5% by weight of dairy ingredients;

(b) about 0.4% to about 1.0% by weight of an added monoglyceride emulsifier;

(c) about 0.02% to about 0.08% by weight of a sodium alginate stabilizer; and

(d) 0% to about 5% by weight of sugar.

4,888,195

ETHER BRIDGED POLYESTERS AND FOOD COMPOSITIONS CONTAINING ETHER BRIDGED POLYESTERS

Stephen D. Huhn, Randolph; Peter S. Given, Jr., Verona, and Lawrence P. Klemann, Somerville, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jul. 26, 1988, Ser. No. 224,409

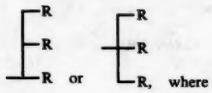
Int. Cl.[4] A23D *1/00*; C07C *69/704*

U.S. Cl. 426—601 **25 Claims**

24. A composition, comprising a food material and a compound defined by the following formula:

$$X—O—Y,$$

where each of X and Y, independently comprises



and where R_1 is an alkyl group having 1 to 24 carbon atoms or alkenyl group having 2 to 24 carbon atoms.

4,888,196

PROCESS FOR TEMPERING FLAVORED CONFECTIONERY COMPOSITIONS CONTAINING REDUCED CALORIE FATS AND RESULTING TEMPERED PRODUCTS

Albert M. Ehrman; Paul Seiden; Rose M. Weitzel, and Robert L. White, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 28, 1989, Ser. No. 329,619

Int. Cl.[4] A23G *3/00*

U.S. Cl. 426—601 **49 Claims**

1. A process for tempering flavored confectionery compositions, which comprises the steps of:

(I) forming a temperable flavor confectionery composition which comprises:

a. a flavor-enhancing amount of a flavor-component;

b. from about 25 to about 45% of a fat component comprising:

(1) at least about 70% of a reduced calorie fat having:

(a) at least about 85% combined MLM and MML triglycerides;

(b) no more than about 5% combined LLM and LML triglycerides;

(c) no more than about 2% LLL triglycerides;

(d) no more than about 4% MMM triglycerides;

(e) no more than about 7% other triglycerides; wherein M is a C_6 to C_{10} saturated fatty acid residue and L is a C_{20} to C_{24} saturated fatty acid residue;

(f) a fatty acid composition having:

(i) from about 40 to about 60% combined C_8 and C_{10} saturated fatty acids,

(ii) a ratio of C_8 to C_{10} saturated fatty acids of from about 1:2.5 to about 2.5:1,

(iii) from about 40 to about 60% behenic fatty acid,

(2) up to about 15% milkfat;

(3) up to about 20% cocoa butter;

(4) no more than about 4% diglycerides; and

c. from about 55 to about 75% other nonfat confectionery ingredients;

(II) rapidly cooling the composition of step (I) to a temperature of about 57° F. (13.9° C.) or less so that the reduced calorie fat forms a sub α phase;

(III) holding the cooled composition of step (II) at a temperature of about 5° F. (13.9° C.) or less for a period of time sufficient to form an effective amount of β-3 crystals from a portion of the sub α phase of the reduced calorie fat; and

(IV) after step (III), warming the cooled composition to a temperature in the range of from above about 57° to about 72° F. (about 13.9° to about 22.2° C.) in a manner such that: (a) the remaining portion of the reduced calorie fat transforms into a stable β-3 phase; and (b) the β-3 phase formed does not melt.

4,888,197

PROCESS FOR PREPARING AN EDIBLE SPREAD CONTAINING A CONTINUOUS FAT PHASE AND AN AQUEOUS PHASE

Theophil Wieske, Hamburg, Fed. Rep. of Germany, assignor to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Sep. 28, 1987, Ser. No. 101,506

Claims priority, application European Pat. Off., Sep. 26, 1986, 86201675.5

Int. Cl.[4] A23D *3/00*

U.S. Cl. 426—602 **15 Claims**

1. A process for preparing an edible spread containing a continuous fat phase and an aqueous phase comprising (a) providing a first fraction consisting of a separately prepared water-and-oil emulsion of which the fat phase of the water-and-oil emulsion consists of fat having an N20 below 5% (b) providing a second fraction consisting of fat having an N20 of at least 7%; (c) adjusting the temperature of said fractions so that the temperature of the first fraction is below 35° C. and the temperature of the second fraction is one at which the N-value of said second fraction is at least 10%; and (d) mixing the first and second fractions together while the said first fraction is at a temperature below 35° C. and the second fraction is at the temperature at which the N-value thereof is at least 10%

4,888,198

COMPRESSED TEXTURIZED SOY PROTEIN PRODUCT AND PROCESS FOR MAKING SAME

Kenneth E. Beery, and Arthur H. Konwinski, both of Fort Wayne, Ind., assignors to Central Soya Company, Fort Wayne, Ind.

Continuation of Ser. No. 941,993, Dec. 15, 1986, abandoned. This application Aug. 10, 1988, Ser. No. 230,852

Int. Cl.[4] A23J *1/14*

U.S. Cl. 426—656 **5 Claims**

1. A method of preparing a texturized and compressed soy protein product comprising the sequential steps of:

(a) texturizing soy protein into structured porous particles;

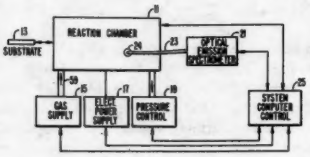
(b) adjusting the moisture content by partially drying the structured porous particles to about 12 to 18%; and

(c) compressing the moisture adjusted structured porous particles into a cake which expands 50 to 150% by volume upon rehydration, wherein the moisture content is about 5 to 15%.

4,888,199
PLASMA THIN FILM DEPOSITION PROCESS

John T. Felts, Alameda, and Eugene S. Lopata, Fremont, both of Calif., assignors to The BOC Group, Inc., Murray Hill, N.J.

Continuation-in-part of Ser. No. 73,928, Jul. 15, 1987, abandoned. This application May 9, 1988, Ser. No. 191,448
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—10 20 Claims



1. In a process of depositing a thin film of material on a substrate in a chamber wherein a plasma is formed with a plurality of controllable process parameters, said plasma containing a plurality of atomic and/or molecular species which each have an observable emission of electromagnetic radiation within a visible or near visible wavelength range whose nature changes upon changing said controllable process parameters, a method of controlling the process, comprising the steps of:

detecting two characteristics of the radiation emission of a single species in the plasma,

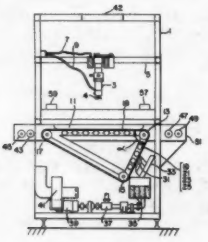
electronically comparing said two characteristics, and

causing one or more of said process parameters to automatically be changed in order to adjust the two detected single species radiation emission characteristics to have a predetermined desired relationship.

4,888,200
PROCESS AND MACHINE FOR ELECTROSTATIC COATING

Robert D. Milliken, Columbia, Md., assignor to W. R. Grace & Co.,-Conn., New York, N.Y.

Filed Apr. 21, 1988, Ser. No. 184,463
Int. Cl.[4] B05D *1/04;* B05B *5/04*
U.S. Cl. 427—31 8 Claims



1. In an electrostatic spray apparatus comprising

(a) a supporting frame;

(b) an electrostatic spray head affixed within said frame;

(c) means to deliver liquid to said spray head;

(d) a movable endless belt positioned under said spray head in a workpiece spray zone; and

(e) means to rotate and return said belt to said spray zone; the improvement wherein

(f) the endless belt is a one piece conductive belt;

(g) the belt return path forms an angle (α), 90° or less, with the path of the belt in the workpiece spray zone;

(h) a squeegee blade is positioned against the belt below the belt return angle for removal of liquid overspray;

(i) a liquid collection means is associated with and under the blade;

(j) a means is provided to recycle liquid from liquid collection means (i) to spray head (b); and

(k) a means is provided for collecting overspray and for draining said overspray onto said belt in said spray zone wherein said means inclines toward the belt (d) and is parallel to the sides of the work piece spray zone.

4. A process for electrostatic spraying a workpiece comprising

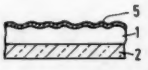
(a) positioning said workpiece on a flat moving endless conductive one piece support, said support being under an electrostatic liquid spray source wherein said moving support is bordered by means for collecting overspray from said spray source and for draining said overspray onto said support; and

(b) blading liquid overspray from the said support and collecting said liquid overspray.

4,888,201
METHOD OF MANUFACTURING A DIFFUSE REFLECTOR

Hendrik Veenvliet; Antonius H. M. Raaymakers; Maarten J. Verkerk, and Arnold H. Witjes, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 13, 1987, Ser. No. 108,403
Claims priority, application Netherlands, Oct. 13, 1986, 8602567
Int. Cl.[4] B29C *59/00;* B29D *11/00*
U.S. Cl. 427—38 20 Claims



1. A method of manufacturing a diffuse reflector having a surface pattern comprising the steps of

(a) providing a layer of synthetic resin on a substrate layer,

(b) forming a profile on a top surface layer of said synthetic resin by the steps of irradiating said top surface layer with UV radiation, and subsequently heating to a temperature of between 180° C. and 250° C., and

(c) etching said profile at least partly into said substrate layer.

4,888,202
METHOD OF MANUFACTURING THIN COMPOUND OXIDE FILM AND APPARATUS FOR MANUFACTURING THIN OXIDE FILM

Toshiaki Murakami, and Kazuyuki Moriwaki, both of Mito, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Jul. 23, 1987, Ser. No. 76,737
Claims priority, application Japan, Jul. 31, 1986, 61-180661; Oct. 23, 1986, 61-252486
Int. Cl.[4] C23C *14/24, 14/48*
U.S. Cl. 427—42 6 Claims

1. A method of manufacturing a thin single crystal film of a compound oxide, comprising the steps of:

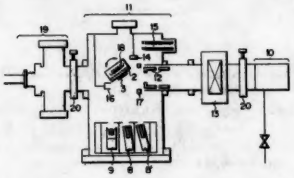
maintaining a vacuum pressure in the order of 10^{-9} Torr or less;

heating a substrate to a temperature of less than 400° C.;

evaporating different types of materials for forming the compound oxide;

depositing the evaporated materials on a substrate to form the thin film;

generating oxygen ions, the oxygen ion generating step including the steps of generating an oxygen plasma, mass-separating oxygen ions from the accelerated oxygen plasma to separate O^+ or O_2^+ ions, and decelerating the



separated oxygen ions to a speed corresponding to energy of 10 to 200 eV; and

implanting oxygen ions, decelerated in the decelerating step and having energy of 10 to 200 eV, in the thin film as it is being formed on said substrate while monitoring and controlling the number of oxygen ions.

4,888,203

HYDROLYSIS-INDUCED VAPOR DEPOSITION OF OXIDE FILMS

Mordechai Rothschild, Newton; Jerry G. Black, Lincoln, and Daniel J. Ehrlich, Lexington, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 13, 1987, Ser. No. 120,350
Int. Cl.[4] B05D *3/06, 5/12*
U.S. Cl. 427—53.4 **14 Claims**

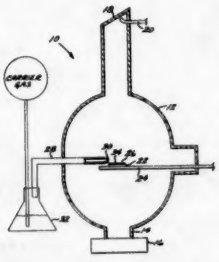
1. A method of forming a protective, metal oxide, film upon a surface of a substrate, the method comprising: exposing a surface of a substrate to water vapor, such that water is adsorbed by the substrate to form a moisture-laden surface, and reacting the moisture-laden surface with a hydrolyzable, active vapor of a metal compound, at a temperature below about 100° C. to induce hydrolysis of the vapor and resulting deposition of a metal oxide film on said surface.

4,888,204

PHOTOCHEMICAL DEPOSITION OF HIGH PURITY GOLD FILMS

Lee W. Tutt, Thousand Oaks, and John E. Jensen, Newbury Park, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 12, 1988, Ser. No. 242,670
Int. Cl.[4] B05D *3/06, 5/12;* **C23C** *16/00*
U.S. Cl. 427—53.1 **18 Claims**



1. A process for depositing a layer of gold onto a substrate, comprising the steps of:

furnishing a substrate having a surface upon which the gold is to be deposited, the substrate being at a temperature of from about 0° to about 160° C.;

contacting the surface of the substrate with a gas containing the organometallic compound $(CH_3)_2Au[CH(COCF_3)_3]$;

photodissociating the organometallic compound with ultraviolet light to deposit gold therefrom onto the surface of the substrate.

4,888,205

METHOD OF TREATING A POLYOLEFIN SUBSTRATE WITH ADHESION PROMOTERS CONTAINING OPTICAL BRIGHTENER

Marvis E. Hartman, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 914,434, Oct. 2, 1986, Pat. No. 4,741,860.
This application Jan. 11, 1988, Ser. No. 142,364
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—54.1 **5 Claims**

1. A method of treating a polyolefin substrate comprising:

(A) applying to the polyolefin substrate a coating composition comprising:

(i) 20 to 80 percent by weight based on total solids weight of the composition of a chlorinated polyolefin and

(ii) from about 0.1 percent to about 2.5 percent by weight based on total solids weight of the composition of an optical brightener and

(iii) 50 to 98 percent by weight based on total weight of the composition of an organic solvent;

(B) forming a substantially continuous film on the substrate; and

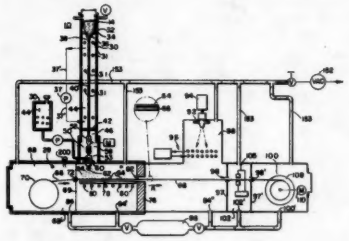
(C) exposing the film formed in step (B) to ultra-violet light and then overcoating the said film with another coating.

4,888,206

METHOD AND APPARATUS FOR COATING A SUBSTRATE WITH ALKALINE OR ALKALINE EARTH METALS

Henry F. Hope, and Stephen F. Hope, both c/o Hope Industries, Inc., 5701 Moreland Rd., Willow Grove, Pa. 19090

Filed May 25, 1988, Ser. No. 198,440
Int. Cl.[4] B05D *1/02*
U.S. Cl. 427—57 **11 Claims**



1. A method for coating a substrate with an alkaline metal or an alkaline earth metal in a controlled inert atmosphere which comprises:

forming a melt of said metal,

breaking said melt into fine droplets,

contacting the surface of a substrate to be coated with said fine droplets so as to form a coating of said metal on said surface, and

cooling said coated substrate.

4,888,207

RECOVERY OF ARSENIC FROM ORES AND CONCENTRATES

Charles M. Flynn, Jr., and Thomas G. Carnahan, both of 1605 Evans Ave., Reno, Nev. 89512

Filed Mar. 15, 1984, Ser. No. 589,799
Int. Cl.[4] C01G *28/00*
U.S. Cl. 423—87 5 Claims

1. A process for recovery of arsenic, as As_2O_3, from arsenical sulfide ores or concentrates comprising:

(a) leaching of the ores or concentrates with an acidic ferric compound-containing leach solution at a temperature of 100° to 150° C. to extract arsenic in the As^{3+} state, wherein the acidic ferric compound is selected from the class consisting of ferric sulfate and sulfuric acid, ferric nitrate and nitric acid, and ferric chloride and hydrochloric acid, and wherein said leach solution additionally contains a leaching catalyst selected from the class consisting of silver sulfate and mercuric sulfate;

(b) separating the pregnant leach solution from the leach residue, and

(c) cooling the pregnant leach solution to crystallize As_2O_3.

4,888,208

CERAMIC SUBSTRATE FOR PRINTED CIRCUITS AND PRODUCTION THEREOF

Satoshi Maeda; Ryu Yoneda; Kenichi Yokota, and Hideo Miyake, all of Ootsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Oct. 1, 1987, Ser. No. 103,456
Claims priority, application Japan, Oct. 16, 1986, 61-246820; Oct. 16, 1986, 61-246822; Oct. 28, 1986, 61-257174; Nov. 5, 1986, 61-264420
Int. Cl.[4] B05D *3/04*
U.S. Cl. 427—96 7 Claims

1. A method of producing ceramic printed circuits wherein at least the surface to be circuit-printed of a ceramic substrate made by sintering is subjected to a roughening treatment with one of the following materials:

(1) substances containing sulfur trioxide, and

(2) substances which, upon decomposition, generate sulfur trioxide, and subsequently printing said circuits by wet plating on the roughened surface.

4,888,209

CATALYTIC PROCESS AND SYSTEMS

James W. Neely, Dresher, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 833,423, Feb. 21, 1986, Pat. No. 4,719,145, which is a continuation of Ser. No. 536,925, Sep. 28, 1983, abandoned. This application Dec. 2, 1987, Ser. No. 109,643
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—97 13 Claims

1. An electroless metal deposition process for printed circuit board surfaces and through-hole walls comprising:

(a) catalyzing a clean printed circuit board surface and through-hole wall surfaces formed in said board by depositing an adherent monolayer of positively charged polymer particles having particle size diameters less than about 3 micrometers and containing one or more catalytically active agents distributed throughout said particles and where said positively charged particles containing said catalytically active agents are dispersed in water forming a stable colloidal dispersion; and

(b) contacting said catalyzed surfaces with a bath containing an electroless metal to deposit an electroless metal layer on said surfaces.

4,888,210

METHOD FOR MAKING TRANSPARENT CONDUCTIVE FILM

Yasuhito Isozaki, Neyagawa; Kazuyuki Okano, Katano, and You Hasegawa, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Sep. 16, 1987, Ser. No. 97,474
Claims priority, application Japan, Sep. 17, 1986, 61-220602
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—126.3 11 Claims

1. A method for making transparent conductive film comprising the steps of:

(a) applying a solution of an organic indium compound and an organic tin compound in a solvent to a substrate to form a film;

(b) subjecting the film to thermal decomposition by heat treatment, and

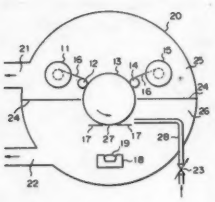
(c) subjecting the thermally decomposed material to heat treatment in an atmosphere containing greater than 0.6% by volume of water vapor.

4,888,211

PROCESS FOR PREPARATION OF VERTICAL MAGNETIC RECORDING MEDIUM

Tetsuo Oka, Otsu; Kenji Hayashi, Kyoto; Takayoshi Akamatsu, and Satoshi Horiuchi, both of Otsu, all of Japan, assignors to Toray Industries, Inc., Japan

Continuation of Ser. No. 84,971, Aug. 12, 1987, abandoned, which is a division of Ser. No. 713,463, Mar. 19, 1985, Pat. No. 4,726,988. This application Nov. 2, 1988, Ser. No. 267,755
Claims priority, application Japan, Mar. 22, 1984, 59-055170; Oct. 15, 1984, 59-214412
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—130 3 Claims



1. A process for the preparation of a vertical magnetic recording medium, which comprises vacuum-evaporating a metal selected from the group consisting of cobalt and iron on a surface of a substrate to form a magnetic layer, wherein the metal is melted and evaporated in a vacuum chamber and a vapor stream thereof is flowed so as to be incident on the substrate surface substantially perpendicular to the substrate surface, while an oxygen gas and at least one gas chemically inactive in the vacuum deposition system, which gas is selected from the group consisting of nitrogen, orgon, helium, neon, xenon, radon, methane and ethane, are introduced into the vacuum chamber to an extent such that the pressure in the vicinity of the substrate is 1×10^{-3} to 5×10^{-2} Torr.

4,888,212

PROCESS FOR THE PREPARATION OF MAGNETIC RECORDING MEDIUM

Shinobu Iida; Masaaki Fujiyama; Shigeo Komine, and Keisuke Yamada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 14, 1987, Ser. No. 107,824

Claims priority, application Japan, Oct. 14, 1986, 61-243553; Oct. 14, 1986, 61-243554

Int. Cl.[4] B05D 5/12

U.S. Cl. 427—130 8 Claims

1. A process for the preparation of a magnetic recording medium which comprises the steps of subjecting a magnetic recording layer coated on a nonmagnetic support to surface smoothening treatment, said magnetic recording layer comprising a ferromagnetic powder dispersed in a binder, and grinding the smoothened surface of the magnetic recording layer and a surface of back layer provided on another surface of the nonmagnetic support by means of a grinder made of a material of high hardness and selected from the group consisting of a fixed blade, a diamond wheel and a rotatable blade.

4,888,213

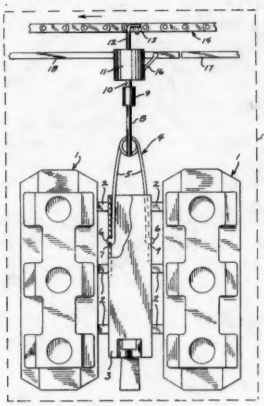
METHOD AND APPARATUS FOR DRYING COATINGS ON ARTICLES

William G. Hesterberg, Rosendale, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Apr. 19, 1988, Ser. No. 183,664

Int. Cl.[4] B44D 1/20; B05D 3/12, 7/22; B05C 13/06

U.S. Cl. 427—133 16 Claims



1. An apparatus for drying a coating on an article, comprising hanger means for suspending a contoured article containing an internal recess, said article having an external surface and an internal surface bordering said recess and having a coating on said surfaces, said coating including an evaporable carrier, means for heating the coated article to an elevated temperature, and rotatable drive means operably connected to said hanger means for rotating said hanger means and said coated article about a vertical axis while said coated article is exposed to said elevated temperature, said drive means being constructed and arranged to rotate said article at a speed sufficient to circulate air within said recess to evaporate said carrier and dry the coating on said surfaces.

4,888,214

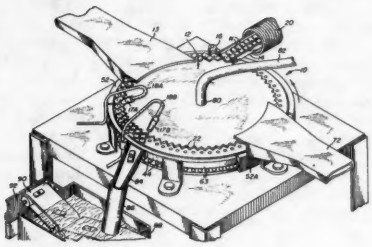
APARATUS AND METHOD FOR COATING FASTENERS

Richard J. Duffy, Utica; Anthony DiMaio, Mephis, and Eugene D. Sessa, Mt. Clemens, all of Mich., assignors to Nylok Fastener Corporation, Rochester, Mich.

Filed Jan. 28, 1988, Ser. No. 149,535

Int. Cl.[4] B05D 1/12, 7/22

U.S. Cl. 427—183 23 Claims



1. Apparatus for applying a coating material onto an article having and opening on at least one end thereof comprising:

a support for receiving said article and conveying it along a path with the article in a substantially fixed relation relative to said support and having the longitudinal axis of the article in an up and down position and with the opening disposed at the lower end thereof and substantially uncovered;

conduit means comprising an elongated tube having its upper end disposed in a first position beneath said support and substantially on the longitudinal axis of said article, said tube having an opening formed in the upper end thereof facing radially outwardly from said tube over an arcuate portion of each said tube, said tube being mounted for relative movement from said first position wherein the upper end thereof lies beneath said support to a second position wherein said upper end of said tube lies within said article opening for application of said coating material;

means for moving said tube from said first position to said second position in response to movement of said support along said path; and

means for adjusting the length of movement of said tube from said first position to said second position.

4,888,215

CARBONACEOUS GRANULAR HEAT INSULATOR AND PROCESS FOR PREPARING THE SAME

Toshio Nakada; Fumio Takemura, and Masao Ishiwata, all of Gotenba, Japan, assignors to Tokai Carbon Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1987, Ser. No. 133,989

Claims priority, application Japan, Jan. 30, 1987, 62-18165; Feb. 27, 1987, 62-42721; Jul. 6, 1987, 62-167003

Int. Cl.[4] B05D 7/00, 3/02

U.S. Cl. 427—215 8 Claims

1. A process for preparing a granular carbonaceous heat insulator, the surface of which is coated with a dense layer of carbon, which comprises the steps:

coating carbon black pellets having voids therein with a volatile organic solvent solution containing 5 to 40 wt. % of a binder consisting of a thermosetting resin, tar or pitch;

heating the carbon black pellets coated with the binder solution at a rate of 20° C./min or less to a temperature of about 200° C., while the pellets are being tumbled in an inert gas stream, to remove the volatile organic solvent, and maintaining the pellets at about 200° C. for 30 min or longer to cure the binder; and

baking the carbon black pellets coated with the cured binder

in a non-oxidizing atmosphere to carbonize the cured binder.

5. A process for preparing a granular carbonaceous heat insulator, the surface of which is coated with a dense layer of carbon, which comprises:

subjecting carbon black pellets made of carbon black to wet granulation in the presence of a volatile organic solvent solution of a binder consisting of a thermosetting resin, tar or pitch, said carbon black pellets having a DBP absorption number of 80 ml/100 g or more, a nitrogen adsorption specific surface area of 35 m^2/g or more, and a true specific gravity-related value (Δd) of 0.150 as defined by the following equation, $\Delta d = d_2 - d_1$, wherein d_1 and d_2 are true specific gravity values of material carbon black after heat treatment at 650° C. and 2600° C., respectively;

heat treating the granulated carbon black pellets to remove the volatile organic solvent and to cure the binder; and

baking the carbon black pellets coated with the cured binder in a non-oxidizing atmosphere to carbonize the cured binder.

4,888,216

COPPER POWDER FOR ELECTROCONDUCTIVE PAINTS AND PROCESS FOR PRODUCTION THEREOF

Kanetaro Sannohe; Hirohisa Senzaki, and Yoshio Sohama, all of Takehara, Japan, assignors to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 141,416, Jan. 7, 1988, Pat. No. 4,833,033. This application Mar. 27, 1989, Ser. No. 329,354

Claims priority, application Japan, Oct. 20, 1987, 62-264952

Int. Cl.[4] B05D *7/00*

U.S. Cl. 427—216 **10 Claims**

1. A process for preparing a copper powder for electroconductive paints, which comprises adding to a dispersion bath of copper powder and a dispersion medium a mixture of effective amounts of a titanium acylate polymer and a higher carboxylic acid ester to form a film of said titanium acylate polymer and said higher carboxylic acid ester on the surfaces of the particles of said copper powder.

4,888,217

SILICONE FOAM MASSES

Gareth M. Jones, Penarth, Scotland, assignor to Dow Corning Limited, London, England

Filed Apr. 14, 1989, Ser. No. 338,081

Claims priority, application United Kingdom, Apr. 20, 1988, 8809293

Int. Cl.[4] B05D *7/22*

U.S. Cl. 427—236 **9 Claims**

1. A method of producing a foamed mass having a density of less than 150 kg/m^3 adherent to surfaces of a cavity which comprises inserting into the cavity a foamable composition formed by mixing impinging jets of two or more parts of a foamable silicone composition capable of curing at 20° C. within 2 minutes to provide a foamed mass having a density of less than 150 kg/m^3 comprising as its principle or sole components (a) one or more polysiloxanes having not less than three alkylhydrogen-siloxane units per molecule, (b) one or more polysiloxanes having not less than two silicon-bonded hydroxyl groups per molecule, (c) one or more compounds having carbon-bonded hydroxyl groups present in a proportion to provide from 0 to 2% by weight of the composition, (d) a polyorganosiloxane comprising $[F(CF_2)_2)_m(CH_2)_nO]_pSiO_{4-p/2}$, $R_3SiO_{\frac{1}{2}}$ and $SiO_{4/2}$ units and silicon-bonded hydroxyl groups wherein each R represents a monovalent hydrocarbon group containing from 1 to 20 carbon atoms, m is an integer having an average value from 1 to 20, n has the value 1 or 2, p has the value 1, 2 or 3 and (e) a platinum catalyst for promoting reaction between the ingredients, the composition being provided as said two or more parts for admixture to form said composition, each of the parts having a similar viscosity at 25° C. one to the other, which is less than 15000 mm^2/s and the components being present in the mixed composition in proportions such that the ratio of silicon-bonded hydrogen atoms of said one or more polysiloxanes having not less than three alkylhydrogen siloxane units per molecule to silicon-bonded hydroxyl groups and carbon-bonded hydroxyl groups of the other components of the composition lies in the range 1:1 to 6:1.

4,888,218

PROCESS FOR APPLYING A ZINC COATING TO AN ALUMINUM ARTICLE

Masamichi Suzuki, Michima; Tadaaki Sano, Fuji; Toshihiro Suzuki, Numazu, and Tsunehiko Tanaka, Fuji, all of Japan, assignors to Alcan International Limited, Montreal, Canada

Continuation of Ser. No. 831,043, Feb. 12, 1986, abandoned, which is a continuation of Ser. No. 608,141, May 8, 1984, abandoned. This application Dec. 16, 1987, Ser. No. 133,265

Claims priority, application Japan, May 9, 1983, 58-80527

Int. Cl.[4] C23C *10/00*

U.S. Cl. 427—383.9 **4 Claims**

1. A process of treating an aluminum article having surfaces to increase the corrosion resistance thereof, comprising the steps of

(a) dissolving solid zinc fluoride in water for establishing an aqueous bath containing dissolved zinc fluoride at a concentration between about 5 g/l and saturation, said bath having a pH of about 4 to about 6 and containing Zn++ ions at a concentration corresponding to the amount of zinc fluoride dissolved in the bath per unit volume of the bath, and

(b) immersing the article in said bath for a time sufficient to deposit zinc on the article surfaces, said zinc fluoride being the source of the deposited zinc, and

(c) heating the article for diffusing the deposited zinc into the surface-adjacent regions of the article.

4,888,219

TEMPERATURE SENSITIVE ARTIFICIAL FLOWER

Daniel F. Barnes, 112 Essex Ave., 36 D, Altamonte Springs, Fla. 32701

Filed Jun. 30, 1989, Ser. No. 373,819

Int. Cl.[4] A41G *1/00*; C09K *19/02*

U.S. Cl. 428—1 **5 Claims**

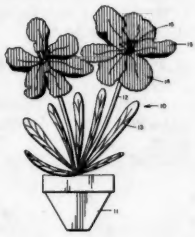
1. An artifical flower comprising:

a stem;

a plurality of blossom petals attached to said stem, each said petal having a polymer substrate; and

at least one said petal having a thermochromatic liquid crystal mixture sandwiched between a transparent polymer substrate and an absorbing background material

which thermochromatic liquid crystal mixture changes color responsive to changes in temperature thereof whereby portions of said artificial flower change color responsive to changes in temperature.



4,888,220

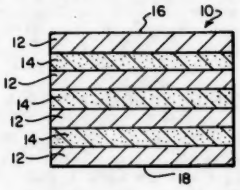
DECORATIVE LAMINATES HAVING 3-DIMENSIONAL EFFECT

Mahendra Mehta, Pickerington, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 101,707, Sep. 28, 1987, abandoned. This application Aug. 16, 1988, Ser. No. 233,183

Int. Cl.[4] B32B *29/00*

U.S. Cl. 428—15 **20 Claims**



1. A decorative laminate comprising a plurality of consolidated resin impregnated fiberous sheets, at least one of said sheets being a 3-dimensional decor sheet formed from bleached cellulose fibers and titanium dioxide and/or pearl pigment, wherein the combined amount (dry weight) of titanium dioxide and/or pearl pigment is such that said sheet exhibits diffused transmission characteristics and bears the following relationship to the basis weight of the sheet.

Basis Weight (lbs)	TiO_2 and/or Pearl Pigment (%)
20–50	0.5–10
50–100	0.5–5
100–200	0.5–2

4,888,221

MONEY TREE

Martine Tischer, 23555 N. Highway 45, Mundelein, Ill. 60060

Continuation-in-part of Ser. No. 83,224, Aug. 10, 1987, Pat. No. 4,776,511. This application Jul. 29, 1988, Ser. No. 225,889

Int. Cl.[4] A41G *1/00*

U.S. Cl. 428—18 **8 Claims**

1. A money tree or bush comprising at least two narrow elongate members, at least two paper-like bills of negotiable currency each pleated into an accordion shape along the length thereof, each bill being separately and individually attached to one of said elongate members forming a branch, and each currency bill being attached to said branch by an attachment member positioned at a point of attachment intermediate pleated end edges of the bill, dividing said bill into substantially identical accordion pleated havles, each of which is fanned out about the point of attachment to form a semi circular structure in the form of an imitation leaf or flower.

4,888,222

OXYGEN IMPERMEABLE LEAK FREE CONTAINER

Charles E. Gibbons; Gerald A. Marano; James M. Kittrell; Allan A. Whillock; Robert L. Lanham, all of Mobile, and Donald Evans, South Mobile, all of Ala., assignors to International Paper Company, Purchase, N.Y.

Filed May 9, 1988, Ser. No. 191,988

Int. Cl.[4] B65B *15/22;* **B32B** *27/00*

U.S. Cl. 428—34.2 **21 Claims**

1. An oxygen barrier laminate structure for producing an oxygen impermeable leak free container comprising:

(a) a mechanically stable structural substrate having an inner and an outer surface;

(b) an outer layer of a heat-sealable low density polyethylene polymer coated on said outer surface of said mechanically stable structural substrate;

(c) an inner layer of a first caulking polymer resin coated on said inner surface of said mechanically stable structural substrate;

(d) an inner oxygen barrier material layer placed on the inner surface of said caulking polymer resin;

(e) a first sandwich layer of a second calking polymer resin and a low density polyethylene polymer coated on the inner surface of said oxygen barrier material layer wherein said caulking polymer resin contacts said oxygen barrier material layer;

(f) a second sandwich inner layer of: a first layer of a low density polyethylene polymer, a first adhesive tie layer, a layer of an ethylene vinyl alcohol copolymer, a second

adhesive tie layer, and a second layer of a low density polyethylene polymer, all coated in the above-listed sequence onto the inner surface of said first sandwich layer of caulking polymer resin and low density polyethylene and contacting said low density polyethylene layer; and

(g) a product contact layer of low density polyethylene polymer extrusion coated on the inner surface of said inner second sandwich layer which can be heat-sealed with the outside layer of low density polyethylene polymer of the laminate on conventional equipment at temperatures ranging from 250° F. to 500° F.

4,888,223

FOOD-PACKAGING MATERIAL AND PROCESS FOR PREPARING THE SAME

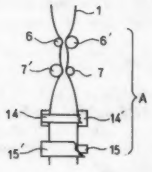
Noritsugu Sugimoto, 4190-banchi, Zama, Zama-shi, Kanagawa-ken; Nobuyuki Mori, 9, 315-banchi, Kitayana, Hatano-shi, Kanagawa-ken; Shozi Nakamura, 1, 221-banchi, Ooaza-Awaji, Chuzu-cho, Yasu-gun, Shiga-ken, and Fusazo Wada, c/o Danshi-Roy of Gunze Limited, 163-banchi, Morikawara-cho, Moriyama-shi, Shiga-ken, all of Japan

Filed May 5, 1988, Ser. No. 190,445

Claims priority, application Japan, May 21, 1987, 62-122459; Apr. 6, 1988, 63-85722

Int. Cl.[4] B65D *85/00;* **B32B** *27/08;* **B29C** *71/04*

U.S. Cl. 428—34.9 **10 Claims**



1. A food-packaging material comprising a heat-shrinkable, gas-barrier, multi-layer plastic film laminate in the form of a seamless tube, wherein said laminate comprises (a) a base layer formed from polyamide resin, (b) an intermediate adhesive layer comprising at least one layer selected from the group consisting of a layer formed from modified polyolefin resin and a layer formed from ethylene-vinyl alcohol copolymer, and (c) an innermost, food-contacting layer formed from polyolefin resin, wherein the innermost, food-contacting surface of said layer of polyolefin resin has an increased wet tension strength obtained by subjecting the innermost, food-containing surfacing of said layer of polyolefin resin to corona discharge applied from at least one pair of positions outside the seamless tube while the seamless tube is in an inflated form, wherein the distance between two positions constituting each pair is approximately equal to the distance separating the opposed surface areas inside the inflated seamless tube at the point of corona discharge.

4,888,224

COMPOSITE TUBULAR ELEMENTS AND METHODS OF FABRICATION

Barry L. Zackrisson, Richfield Center, and John A. Beckman, Toledo, both of Ohio, assignors to Dana Corporation, Toledo, Ohio

Continuation of Ser. No. 857,717, Apr. 30, 1986, abandoned. This application Oct. 17, 1988, Ser. No. 259,484

Int. Cl.[4] F16C *1/00;* **F32B** *1/08*

U.S. Cl. 428—35.9 **17 Claims**

1. A composite fiber reinforced vehicle drive shaft comprising:

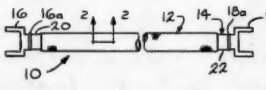
an elongate cylindrical metal tube having a longitudinal axis;

a separate metal connecting member secured to each end of said metal tube and adapted to be coupled to a vehicle drive train component;

a cylindrical reinforcing sleeve secured to a cylindrical surface of said metal tube and extending longitudinally along said tube between said connecting members, said reinforcing sleeve including an isolation layer adjacent said cylindrical surface of said tube, a reinforcing fiber layer adjacent said isolation layer, and a covering layer adjacent said reinforcing fiber layer;

a cured resin impregnated into and forming a matrix for securing said isolation, fiber reinforcing, and covering layers to each other;

said isolation layer including a plurality of strips of flexible



sheet material contacting said metal tube and extending longitudinally along said tube with adjacent ones of said strips having overlapping longitudinal edge portions to prevent direct contact between said reinforcing fiber layer and said cylindrical surface of said tube;

said reinforcing fiber layer increasing the stiffness of said metal tube and being formed of a plurality of separate tows individually and uniformly circumferentially positioned on said isolation layer in parallel relationship to said longitudinal axis of said tube, each of said tows including a plurality of continuous reinforcing fibers; and

said covering layer including a string material circumferentially positioned on said reinforcing fiber layer for maintaining said reinforcing fibers adjacent said isolation layer.

4,888,225

RESIN-IMPREGNATED FOAM MATERIALS AND METHODS

Timothy C. Sandvig, Woodville, Wis.; Dennis C. Bartizal; Matthew T. Scholz, both of Woodbury, Minn.; Anthony J. Campagna, Roseville, Minn., and Chris J. Libbey, St. Joseph Township, St. Paul County of St. Croix, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 15,972, Feb. 18, 1987, which is a continuation-in-part of Ser. No. 784,345, Oct. 4, 1985, Pat. No. 4,683,877. This application Jun. 3, 1988, Ser. No. 202,500

Int. Cl.[4] A43B *7/32, 13/42, 19/00, 21/06;* **A61F** *5/04*

U.S. Cl. 428—71 **33 Claims**

33. A laminating material for mounting a walking heel to an orthopedic cast, said laminating material comprising:

an open-celled foam sheet; and

a curable prepolymer resin impregnated into said open-celled foam sheet, said resin-impregnated foam sheet being

packaged as a laminating material for mounting a walking heel to an orthopedic cast;

wherein upon curing said resin-impregnated foam sheet becomes rigid and weight bearing so as to provide adequate support between said walking heel and said orthopedic cast.

4,888,226

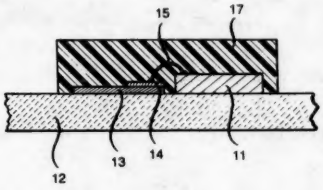
SILICONE GEL ELECTRONIC DEVICE ENCAPSULANT

Ching P. Wong, Lawrenceville, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Aug. 8, 1988, Ser. No. 229,403

Int. Cl.[4] B32B *9/04*

U.S. Cl. 428—76 **7 Claims**



1. An article of manufacture comprising an electronic device encapsulated by a material including a silicone resin wherein the encapsulant material consists essentially of (a) 15 to 30 weight percent of a silcone gel selected from the group consisting of (i) polydimethylsiloxane having vinyl and hydride functional components and a platinum catalyst and (ii) polymethylphenylsiloxane having vinyl and hydride functional components and a platinum catalyst, (b) 50 to 80 weight percent of silicon dioxide, and (c) 4.5 to 16 weight percent of silicon hydride composition.

4,888,227

ZINC TITANATE IN POLY(ARYLENE SULFIDE) COMPOSITIONS

Robert J. Martinovich, and John E. Leland, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 612,537, May 21, 1984, Pat. No. 4,798,863. This application Sep. 19, 1988, Ser. No. 246,389

Int. Cl.[4] B32B *1/04*

U.S. Cl. 428—76 **13 Claims**

1. An encapsulated active electronic component comprising an electronic component encapsulated in a composition characterized by

(i) about 25 to about 45 weight percent poly(arylene sulfide);

(ii) about 0.1 to about 10 weight percent zinc titanate;

(iii) about 5 to about 30 weight percent reinforcement; and

(iv) about 40 to about 60 weight percent filler;

wherein said weight percentages are based upon the total weight of (i), (ii), (iii) and (iv); and wherein the viscosity of said composition does not exceed about 800 poise.

4,888,228

COMPOSITE LAMINATES COMPRISING MATRIX BOUND PLIES HAVING INTERLOCKED TRANSVERSE FIBERS AND A METHOD OF MAKING THE SAME

James Sidles, Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

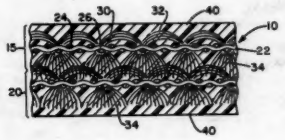
Filed Aug. 29, 1988, Ser. No. 237,354

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—86 **17 Claims**

1. A composite comprising:

at least two layers, each layer comprising a substantially planar substrate having a first side and a second side and having a plurality of fibers, said fibers forming fiber tips on the first side and the second side of said planar substrate, and said fibers forming loops on at least the first side of the substrate so as to structurally anchor the fibers to the substrate;



said layers being stacked in opposition so that the fiber tips on one layer cooperate with the fiber tips of the opposing layer and form interstices therebetween;

and a binder which substantially impregnates the interstices.

4,888,229

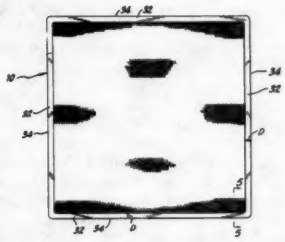
WIPERS FOR CLEANROOM USE

Steven J. Paley, Aberdeen; Clifford A. Eberhardt, and Edward Paley, both of Saddle Brook, all of N.J., assignors to The Texwipe Company, Upper Saddle River, N.J.

Filed Apr. 8, 1988, Ser. No. 179,206

Int. Cl.[4] B32B *23/02*

U.S. Cl. 428—192 **11 Claims**



1. In a wiper of the type constructed at least partially from a fabric material chosen from a woven material, a non-woven material or a knitted material, the fabric material including thermoplastic filaments, by severing the wiper along peripheral edges thereof from a sheet of such material having indeterminate dimensions, whereby the severing of the wiper from the sheet establishes segments of the filaments potentially freed for release from the wiper during use of the wiper, the potentially-freed segments having a maximum length, an improvement enabling the reduction of particulate contamination which otherwise might result from the use of the wiper in a controlled environment, such as that maintained in a cleanroom, the improvement comprising: a fused border in the material of the wiper along the peripheral edges of the wiper, the fused border extending inwardly into the wiper a distance so related to the maximum length of the potentially-freed segments of the filaments as to capture and maintain within the fused border those potentially-freed segments of the material of the wiper which otherwise might be released from the peripheral edges of the wiper during use of the wiper, while maintaining pliability and absorbency in the wiper for wiping procedures.

4,888,230

ONE-FIRE UNDERGLAZE DECAL SYSTEM

James W. Cutright, Columbiana, Ohio, assignor to The Homer Laughlin China Company, Newell, W. Va.

Filed Sep. 16, 1988, Ser. No. 245,768
Int. Cl.[4] B32B *3/00*
U.S. Cl. 428—195 17 Claims

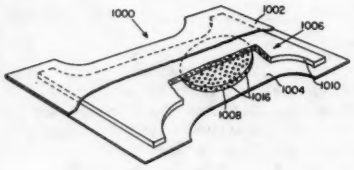
1. A decalcomania for mounting on a ceramic substrate comprising inorganic powders suspended in an organic vehicle on a non-wood derived paper backing, said paper of a type which decomposes and gasifies at temperatures below a curing and bisque forming temperature of the ceramic substrate.

4,888,231

ABSORBENT CORE HAVING A DUSTING LAYER

John J. Angstadt, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 868,217, May 28, 1986, abandoned. This application Jun. 30, 1987, Ser. No. 68,598
Int. Cl.[4] A61F *13/16;* B32B *5/16, 5/26, 5/30*
U.S. Cl. 428—213 10 Claims



1. An absorbent article comprising:
a topsheet;
a liquid impervious backsheet associated with said topsheet; and
a dual-layer absorbent core disposed between said topsheet and said backsheet, said dual-layer absorbent core comprising:
(i) a shaped core component that quickly collects and distributes discharged body liquids, and
(ii) an insert core component that absorbs and retains discharged body fluids from said shaped core component, said shaped core component being positioned between said topsheet and said insert core component, said insert core component comprising:
(a) a dusting layer consisting of hydrophilic fiber material, and
(b) a primary layer consisting of a combination of hydrophilic fiber material and particular amounts of discrete particles of absorbent gelling material airlaid over said dusting layer,
wherein said dusting layer is relatively thinner in thickness than said primary layer, and wherein said dusting layer is disposed adjacent said backsheet.

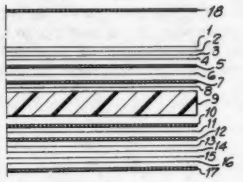
4,888,232

ELECTRICALLY CONDUCTIVE BOARD

Michael E. R. Sällberg, Mölnbo, Sweden, assignor to Selcro Limited, London, United Kingdom

Filed Jun. 5, 1987, Ser. No. 58,929
Int. Cl.[4] B32B *7/02*
U.S. Cl. 428—215 6 Claims

1. Electrically conductive layer board for us with electrical equipment provided with piercing connectors for display purposes comprising:
(a) a film polyvinyl chloride having a thickness corresponding to 8–22 g/m^2
(b) a layer of adhesive amounting to 15–40 g/m^2.
(c) a first layer of aluminum having a thickness of 21–65 μm,
(d) a layer of adhesive corresponding to 2–5 g/m^2.
(e) a layer of paper of 80–40 g/m^2.
(f) a film of polyethylene of 20–40 g/m^2.
(g) a layer of polyurethane foam being at least 2 mm thick and having a density of 20–90 kg/m^3.
(h) a second layer of aluminum foil having a thickness of 21–65 μm,



(i) a layer of adhesive amounting to 2–5 g/m^2.
(j) a layer of paper of 80–140 g/m^2.
(k) a film of polyethylene having a thickness corresponding to 20–40 g/m^2.

4,888,233

FIRE RESISTANT COMPOSITE MATERIALS

Allan T. Brew, Warrington, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 7, 1988, Ser. No. 165,240
Claims priority, application United Kingdom, Mar. 11, 1987, 8705804
Int. Cl.[4] B32B *1/00*
U.S. Cl. 428—220 12 Claims

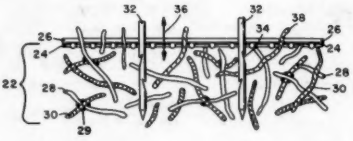
1. A fire-resistant and heat-resistant composite material comprising a polymeric material substrate having thereon a coating comprising lamellae of chemically delaminated vermiculite and a copolymer of ethylene with a vinyl monomer.

4,888,234

FORMABLE FIBER COMPOSITE

Gerald J. Smith; Elwood G. Trask, both of Auburn, Me.; Paul Ellis, Denver, Colo.; Jon Johnston, Denver, Colo.; Brian Campbell, Denver, Colo., and Leon Rorie, Denver, Colo., assignors to Gates Formed-Fibre Products, Inc., Auburn, Me.

Continuation of Ser. No. 887,153, Jul. 17, 1986, abandoned. This application Feb. 17, 1988, Ser. No. 161,224
Int. Cl.[4] B32B *5/02*
U.S. Cl. 428—234 33 Claims



1. A contoured composite comprising:
a sheet of foil;
a substrate, which substrate is nonwoven batt of fibers of at least one synthetic thermoplastic resin;
the foil being tacked onto the substrate by a needle loom to form a composite; and
the substrate fibers, having the property of softening when heated for a period of time to the temperature of their softening point and subsequently rehardening when cooled for a period of time, taking the shape of a predetermined contour against which the composite is set during at least part of the heating and cooling periods.

4,888,235

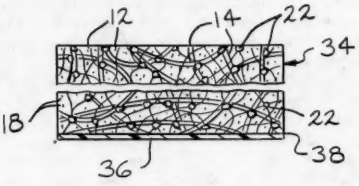
IMPROVED NON-WOVEN FIBROUS PRODUCT

Vaughn C. Chenoweth, Coldwater, and Robert C. Goodsell, Marshall, both of Mich., assignors to Guardian Industries Corporation, Northville, Mich.

Continuation of Ser. No. 195,262, May 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 53,046, May 22, 1987, Pat. No. 4,752,197. This application Mar. 13, 1989, Ser. No. 322,642

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—283 22 Claims



1. A non-woven fibrous product comprising, in combination, a blended matrix of glass fibers and synthetic fibers having a conductive material and a thermosetting resin dispersed in said matrix, said synthetic fibers selected from the group consisting of polyester, nylon or aramid fibers and said conductive material constituting about 2 weight percent or less of said product.

4,888,236

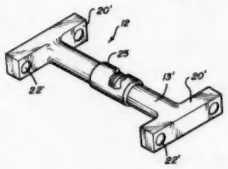
TORQUE ROD OF COMPOSITE MATERIAL

William H. Trudeau, Brighton, Mich., assignor to O & S Manufacturing Company, Whitmore Lake, Mich.

Filed Apr. 18, 1988, Ser. No. 182,962

Int. Cl.[4] B27N *5/02*

U.S. Cl. 428—34.1 18 Claims



9. A torque rod preform for a heavy duty motor vehicle comprising:

a substantially cylindrical, axially elongated body composed of a polymerizable composite material; and

said body including a first portion and a second portion, said portions being loosely interlockable to form an interlocked area and a sleeve slidable from a first position on one of said first or second portions to a second portion over said interlocked area of said first portion and said second portion when said portions are loosely interlocked.

4,888,237

PROCESS FOR MANUFACTURING A METALLIZED POLYOLEFIN FILM AND RESULTING FILM

Ricardo Balloni, Fairport; Jay K. Keung, Macedon, and Eldridge M. Mount, III, Fairport, all of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 16, 1988, Ser. No. 156,127

Int. Cl.[4] C09J *7/02*; B32B *15/08*

U.S. Cl. 428—347 14 Claims

1. A metallized flexible polymeric film comprising:

at least one metal-receiving layer possessing a glossy metal-receiving, polyolefin surface treated by exposure to flame prior to metallization to significantly enhance the adhesion of subsequently applied metal to said surface, said polyolefin containing at least about 50 weight percent of a substantially isotactic homopolymer and possessing an average xylene soluble content of not more than about 10 weight percent.

4. The metallized film of claim 1 wherein said substantially isotactic homopolymer is polypropylene which has a degree of atacticity of not more than about 6%.

5. The metallized film of claim 4 wherein said metal-receiving layer further comprises a second substantially isotactic hompolymer having a degree of atacticity of from about 6% to about 15%, said second homopolymer present in an amount up to about 50% by weight of said metal-receiving layer.

4,888,238

SUPERABSORBENT COATED FIBERS AND METHOD FOR THEIR PREPARATION

Leon Katz, Stamford, Conn., and David H. Hollenberg, Neenah, Wis., assignors to James River Corporation, Richmond, Va.

Filed Sep. 16, 1987, Ser. No. 97,179

Int. Cl.[4] B05D *3/02, 7/00*; D02G *3/00*

U.S. Cl. 428—378 26 Claims

1. A method of preparing superabsorbent synthetic fibers coated with a water absorbent polymer which comprises (1) preparing an aqueous solution of an anionic polyelectrolyte and a polyvalent metal salt, said anionic polyelectrolyte being maintained water-soluble in the presence of said polyvalent metal salt by the addition of a neutralizing agent, (2) adding synthetic fibers to the polymeric solution to coat said fibers therewith, and (3) fluff drying said coated synthetic fibers to form a complex of said polyelectrolyte thereon in situ.

2. The method of claim 1 wherein said anionic polyelectrolyte is polyacrylic acid or poly (methyl vinyl ether/maleic anhydride copolymer).

23. A coated fiber produced by the method of claim 2.

4,888,239

ETHANOL FILL FORMULATION FOR SOFGELS ETC.

Werner Brox, Beerfelden, Fed. Rep. of Germany, assignor to R. P. Scherer Corporation, Troy, Mich.

Filed Aug. 25, 1987, Ser. No. 89,065

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1986, 3629386

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—402.2 20 Claims

1. A capsule having a gelatin shell and the filling therein, said filling comprising an active material and a solvent, said solvent consisting essentially of at least 5% by weight of ethanol and at least 20% by weigh of partial glycerides of fatty acids having from 6–18 carbon atoms.

4,888,240

HIGH STRENGTH PARTICULATES

John W. Graham, Rte. 5, Box 289 (210 // Rd. 147), Alvin, Tex. 77511, and A. Richard Sinclair, 2903 Virginia, -Houston, Tex. 77098

Continuation of Ser. No. 626,754, Jul. 2, 1984, Pat. No. 4,585,064. This application Aug. 26, 1985, Ser. No. 769,065

Int. Cl.[4] B32B *27/02*

U.S. Cl. 428—403 19 Claims

1. A high strength free flowing self-consolidating particle comprising:

a particulate substrate;

an inner coating of a substantially cured resin covering said substrate said coating increasing the crush resistance of said substrate; and

a non-tacky solid outer coating of heat fusible curable resin covering said inner coating.

4,888,241

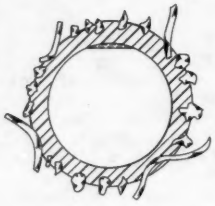
LOW DENSITY COMPOSITE OPACIFIERS

George E. Melber, Depew, and Leon Wolinski, Checktowago, both of N.Y., assignors to Pierce & Stevens Corporation, Buffalo, N.Y.

Division of Ser. No. 225,755, Jul. 29, 1988, which is a continuation-in-part of Ser. No. 28,119, Mar. 19, 1987, Pat. No. 4,722,943, which is a continuation-in-part of Ser. No. 103,203, Oct. 1, 1987, Pat. No. 4,829,094, which is a continuation-in-part of Ser. No. 103,204, Oct. 1, 1987, which is a division of Ser. No. 28,119, Mar. 19, 1987, Pat. No. 4,772,953. This application Jun. 6, 1989, Ser. No. 362,314

Int. Cl.[4] C08J 9/22, 9/32

U.S. Cl. 428—407 6 Claims



1. A composite opacifier for coatings comprising:

A. thermoplastic polymer microspheres; and

B. particulate inorganic opacifier component, a material portion thereof having a particle size of from about 200 to about 2000 millimicrons in diameter;

C. said particulate opacifier component comprising from about 20 to 97 weight per cent of the mixture and being adhered to and embedded in the surface of said microspheres: and

D. said composite opacifier having a composite specific gravity of from about 0.1 to about 2.8 gm/cc.

4,888,242

GRAPHITE SHEET MATERIAL

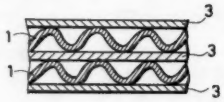
Koichiro Matsuo, Osaka; Kazuhiro Maekawa, Kawanishi, and Teruhisa Kondo, Toyonaka, all of Japan, assignors to Toyo Tanson Co., Ltd., Osaka, Japan

Filed May 26, 1987, Ser. No. 53,645

Claims priority, application Japan, May 27, 1986, 61-121893; Jul. 11, 1986, 61-164317; Aug. 8, 1986, 61-186662

Int. Cl.[4] B32B 9/00, 3/25, 3/30; H05B 6/16

U.S. Cl. 428—408 12 Claims



1. A refractory heat-insulating graphite sheet material characterized in that the material comprises an expanded graphite sheet having an impurity content of not higher than 100 ppm.

4,888,243

PROCESS FOR ANTISTATIC TREATMENT OF PLASTIC MOULDINGS

Friedrich Jonas, Aachen, and Werner Waldenrath, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 14, 1988, Ser. No. 219,104

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1987, 3725575

Int. Cl.[4] B05D 3/02, 5/12; B32B 9/04

U.S. Cl. 428—411.1 9 Claims

1. In the process for the preparation of a plastic moulding antistatically treated with a layer of polypyrrole, wherein the plastic moulding is coated with a layer of polypryyole, the improvement which comprises carrying out the treatment in the following manner:

1. coating the plastic moulding with an organic solvent solution which contains
   (a) an effective amount of oxidizing agent suitable for oxidation polymerization of pyrrole and
   (b) an effective amount of polymeric binder which is insoluble or at least only sparingly soluble in water;
2. removing the organic solvent from the coating;
3. treating the coated moulding with a solution of pyrrole in an organic solvent in which the plastic to be coated and the substances applied to it, the oxidizing agent and the organic polymeric binder, are insoluble;
4. removing the organic solvent from the coating;
5. washing the coated plastic moulding with water to remove inorganic compound which are not bound as polymers; and
6. drying the coated plastic moulding and, optionally,
7. subjecting it to thermal after-treatment.

9. An antistatically treated plastic moulding prepared by the process of claim 1.

4,888,244

PROCESS FOR FORMING COMPOSITE COATED FILM

Yoichi Masubuchi; Tadashi Watanabe; Akira Tominaga; Haruo Nagaoka; Eisaku Nakatani, and Masafumi Kume, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed Sep. 10, 1986, Ser. No. 905,454

Claims priority, application Japan, Sep. 10, 1985, 60-199709

The portion of the term of this patent subsequent to Aug. 2, 2005, has been disclaimed.

Int. Cl.[4] C25D 13/06

U.S. Cl. 428—416 23 Claims

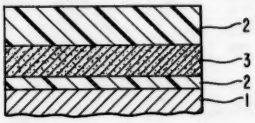
1. A process for forming a composite coated film, which comprises coating a cationically electrodepositing paint film on the surface of a substrate, said electrodepositing paint being composed mainly of a cationic resin having a functional group capable of reacting with isocyanate groups and substantially free from a crosslinking agent, then coating an organic solvent-base paint containing a polyisocyanate compound having per molecule at least two isocyanate groups which is partly or fully blocked with a blocking agent capable of being dissociated at a temperature of not more than 130° C., said solvent-based paint being capable of forming a coated film having a static glass transition temperature of 0° to −75° C. on the surface of the coated electrodepositing paint film, and then coating a top coat paint thereupon.

4,888,245

FLUOROPLASTIC COATING WITH A FILLER OF ACTIVATED CARBON FOR PREVENTING CORROSION

Richard Witzko, Egliing, Fed. Rep. of Germany, assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Mar. 17, 1988, Ser. No. 169,634
Int. Cl.[4] B32B *15/08*
U.S. Cl. 428—421 4 Claims



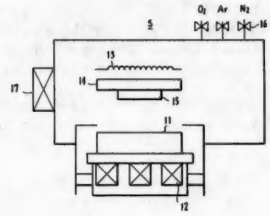
1. A multilayer coatings system for protecting metal surfaces from corrosion comprising at least one layer of fluoroplastic and activated carbon over a metal surface and at least one layer of fluoroplastic as an outer surface layer.

4,888,246

DIELECTRIC THIN FILM, AND METHOD FOR MAKING THE THIN FILM

Jun Kuwata, Osaka; Yosuke Fujita, Ashiya; Takao Tohda; Atsushi Abe, both of Ikoma, and Tomizo Matsuoka, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed May 23, 1986, Ser. No. 866,206
Claims priority, application Japan, May 23, 1986, 60-110813; May 23, 1986, 60-110814
Int. Cl.[4] B32B *15/00*; C23C *14/34*
U.S. Cl. 428—432 11 Claims



1. In a dielectric thin film element which comprises a dielectric substrate and a dielectric thin film of a perovskite type oxide formed on said substrate, the improvement wherein

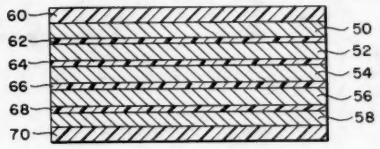
said dielectric thin film is formed by sputtering a composite perovskite oxide of the formula AMO_3, wherein A represents at least two members selected from the group consisting of Ca, Sr, Ba and Pb and M represents at least two members selected from the group consisting of Ti, Zr, Hf and Sn in an atmosphere comprising a mixture of nitrogen and oxygen or a mixture of nitrogen, oxygen and argon, to form a dielectric thin layer on said dielectric substrate, said dielectric thin film comprising nitrogen and therefore having an improved breakdown electric field strength.

4,888,247

LOW-THERMAL-EXPANSION, HEAT CONDUCTING LAMINATES HAVING LAYERS OF METAL AND REINFORCED POLYMER MATRIX COMPOSITE

Carl H. Zweben, Devon, Pa.; Rodman A. Mogle, Clinton, N.Y.; Benjamin T. Rodini, Jr., Wayne, and Charles L. Thaw, Phoenixville, both of Pa., assignors to General Electric Company, King of Prussia, Pa.

Filed Aug. 27, 1986, Ser. No. 900,984
Int. Cl.[4] B32B *5/16*
U.S. Cl. 428—105 37 Claims



1. A heat conducting laminate comprising at least one layer of metal and at least one layer of thermoset polymer matrix composite material having low-thermal-expansion reinforcing material embedded therein.

4,888,248

COLLOIDAL METAL DISPERSION, AND A COLLOIDAL METAL COMPLEX

Hidefumi Hirai; Makoto Komiyama, both of Tokyo, and Michitaka Otaki, Yokohama, all of Japan, assignors to Hidefumi Hirai, Tokyo, Japan

Filed May 7, 1987, Ser. No. 46,608
Claims priority, application Japan, Jul. 1, 1986, 61-152761; Jul. 8, 1986, 61-158676; Jul. 24, 1986, 61-172781; Jul. 24, 1986, 61-172782; Aug. 15, 1986, 61-190435; Aug. 15, 1986, 61-190436; Dec. 17, 1986, 61-298835; Dec. 17, 1986, 61-298836; Dec. 17, 1986, 61-298837; Dec. 17, 1986, 61-298838; Dec. 17, 1986, 61-298839; Dec. 17, 1986, 61-298840
Int. Cl.[4] A61K *47/00*; B01J *13/00*; C12N *11/14*; C08K *9/10*
U.S. Cl. 438—403 34 Claims

1. A colloidal metal complex comprising:

colloidal particles of at least one metal selected from the group consisting of metals belonging to Groups Ib, VIIb and VIII of the Periodic Table;

amino group-containing compound or polymer; and

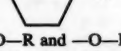
a protective polymer adsorbed on said colloidal particles,

said protective polymer comprising 1 to 100 mol percent, based on the total of units (i), (ii) and (iii), of units (i) represented by the formula [I]

[I]

wherein

R^1 is selected from the group consisting of a hydrogen atom, a substituted or unsubstituted alkyl group having to 6 carbon atoms, a substituted or unsubstituted phenyl group, a hydroxyl group



—CO—R and —O—R', wherein

R is selected from the group consisting of a substituted or

unsubstituted alkyl group having 1 to 10 carbon atoms and $-(CH_2)_{n1}-X_{n2}-(CH_2)_{n1}-X_{n2}-(CH_2)_{n3}-Y_{n4}-(CH_2)n5-CO-R^7$, $(CH_2)_{n5}-CO-R^7$

wherein

X and Y are each independently selected from the group consisting of —O— and —NH—, —A—R^8 and —NH_2,

R^7 is selected from the group consisting of —NH—NH_2, —A—R^8 and —NH_2, wherein

A is selected from the group consisting of —O—and —S—, and

R^8 is selected from the group consisting of a substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, a substituted or unsubstituted phenyl group and a substituted or unsubstituted succinimido group,

n1, n3 and n5 each independently represent an integer of 0 to 6, and

n2 and n4 each independently represent an integer of 0 or 1, and

R′ has the same meaning as R, and

R^2 represents $-(CH_2)_{n1'}-X'_{n2'}-(CH_2)_{n3'}-Y'_{n4'}-(CH_2)_{n5'}-CO-R^{7'}$ wherein

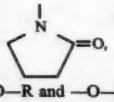
X′, Y′, $R^{7'}$, n1′, n2′, n3′, n4′ and n5′ respectively have the same meanings as X, Y, R^7, n1, n2, n3, n4 and n5;

0 to 99 mol percent, based on total of units (i), (ii) and (iii), of units (ii) represented by the formula [II]

[II]

wherein

R^3 is selected from the group consisting of a hydrogen atom, a substituted or unsubstituted alkyl group having 1 to 6 carbon atoms, a substituted or unsubstituted phenyl group, a hydroxyl group



—CO—R and —O—R′ wherein

R and R′ are as defined above, and

R^4 represents $-(CH_2)_{n1''}-X''_{n2''}-(CH_2)_{n3''}-Y''_{n4'}-(CH_2)_{n5''}-CO-R-R^9$ wherein

X″, Y″, n1″, n2″, n3″, n4″ and n5″ respectively have the same meanings as X, Y, n1, n2, n3, n4 and n5, and

R^9 represents —A′—R^{10}, wherein

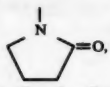
A′ has the same meaning as A, and

R^{10} is selected from the group consisting of a hydrogen atom, an alkali metal, an alkaline earth metal, a substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, a substituted or unsubstituted phenyl group and a substituted or unsubstituted succinimido group; and

0 to 99 mol percent, based on total of units (i), (ii) and (iii), of units (iii) represented by the formula [III]

[III]

wherein R^5 is selected from the group consisting of a hydrogen atom, a substituted or unsubstituted alkyl group having 1 to 6 carbon atoms, a substituted or unsubstituted phenyl group, a hydroxyl group

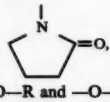


—CO—R and —O—R′

wherein

R and R′ are as defined above, and

R^6 is selected from the group consisting of a hydroxyl group,



—CO—R and —O—R′ wherein

R and R′ are as defined above;

said protective polymer being bonded to said amino group-containing compound or polymer directly or through the residue of a bifunctional compound reactive to an amino group, thereby binding said colloidal particles to said amino group-containing compound or polymer;

provided that

where R^1 is a hydrogen atom or a substituted or unsubstituted alkyl group having 1 to 6 carbon atoms, the proportions of units (i), (ii) and (iii) are respectively 1 to 95 mol percent, 0 to 90 mol percent and 5 to 99 mol percent, based on the total of units (i), (ii) and (iii);

where R^7 is —NH—NH_2, the —NH—NH_2 groups or part or all of the —NH—NH_2 groups are modified to form —N_3 groups;

where R^7 is —A—R^8, said colloidal particles are bound to said amino group-containing compound or polymer directly; and

where said protective polymer is a copolymer of acrylamide and N-vinyl-2-pyrrolidone and said amino group-containing compound or polymer is aminoethylated polyacrylamide, said protective polymer is bonded to said amino group-containing compound through the residue of a bifunctional compound reactive to an amino group.

4,888,249

METHOD FOR IMPROVING THE BOND STRENGTH OF SARAN POLYMERS TO POLYAMIDES

David P. Flores, Lake Jackson, Tex., and Philip E. Alei, Concord, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 140,846, Jan. 5, 1988, abandoned. This application Mar. 28, 1989, Ser. No. 329,904

Int. Cl.[4] B32B *27/08*

U.S. Cl. 428—476.1 **8 Claims**

1. A polymer composite of two or more layers of at least two different polymer compositions, at least one of such layers being

(I) a polyamide and another such layer being

(II) a polymer composition comprising

(A) from about 50 to about 90 percent by weight of a homopolymer or copolymer of vinylidene chloride which homopolymer or copolymer is essentially free of carboxyl, acid anhydride, hydroxyl and epoxy groups;

(B) from about 50 to about 10 percent by weight of a polymer selected from the group consisting of

(1) low density polyethylene (LDPE);

(2) high density polyethylene (HDPE);

(3) linear low density polyethylene (LLDPE);

(4) polypropylene homo or copolymers;

(5) copolymer of ethylene and at least one comonomer of acrylic acid or methacrylic acid or

(6) any combination thereof; and

(C) a compatibilizing amount of a copolymer of ethylene and at least one lower alkyl or hydroxyalkyl ester of acrylic acid or methacrylic acid; and

wherein within said composite, at least two such layers comprise one layer of polymer (I) directly bonded to one layer of polymer (II) without an adhesive layer therebetween.

2. A polymer composite of claim 1 wherein component (A) is a copolymer of vinyl chloride and vinylidene chloride; component (B) is (a) a LDPE polymer, (b) a copolymer of ethylene and propylene, (c) a copolymer of ethylene and acrylic acid, (d) a LLDPE polymer, (e) an HDPE polymer, or (f) any combination thereof; component (C) is (a) a copolymer of ethylene and methyl acrylate, (b) a copolymer of ethylene and ethylacrylate or a combination thereof; and the polyamide is nylon 6.

4,888,250

ELECTROCONDUCTIVE COATINGS

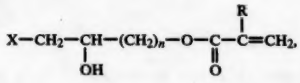
Wen B. Chiao; Carmine P. Iovine, both of Bridgewater, and Samuel Gold, Watchung, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Division of Ser. No. 13,151, Feb. 10, 1987, Pat. No. 4,788,267. This application Aug. 31, 1988, Ser. No. 271,508

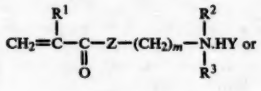
Int. Cl.[4] B32B *27/10*

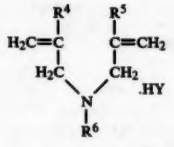
U.S. Cl. 428—514 **19 Claims**

1. An electroconductive coating for a paper substrate, which consists essentially of an aqueous solution of a cationic, self-crosslinking, alkaline-curable polymer and an alkali or alkaline earth salt; the polymer consisting essentially of (a) about 70 to 98 mole % of a non-crosslinking, cationic quaternary ammonium salt monomer, (b) about 1 to 20 mole % of a halohydrin monomer having the formula



where X is chlorine, bromine, or iodine, n is 1, and R is H or CH_3, (c) about 1–10 mole % of a secondary or tertiary amine salt monomer having the formula





where R^1 is H or CH_3, R^2 is H when R^3 is a C_1–C_4 linear alkyl, or R^2 and R^3 are independently a lower alkyl, or R^3 is H when R^2 is a C_1–C_4 linear alkyl, R^4, R^5, and R^6 are independently H or a C_1–C_4 linear alkyl, m is 2 or 3, Z is —NH— or —O—, and HY is an organic or inorganic acid, and (d) 0 to about 28 mole % of a vinyl polymerizable monomer other than (a), (b), or (c), with the mole percentage totalling 100%; wherein the polymer crosslinks, in the presence of an alkali or alkaline earth salt, at a lower temperature than a polymer without the amine salt of (c).

4,888,251

PERSONAL MEMENTO INCLUDING A MILK TOOTH OF A CHILD

Akihisa Nakada, Kyouto, Japan, assignor to Park H. Woo, Osaka, Japan

Filed Aug. 11, 1988, Ser. No. 231,059

Int. Cl.[4] B44C *5/00*; G09F *19/00*

U.S. Cl. 428—542.4 **10 Claims**

1. A memory article serving as a personal memento, comprising:

at least one milk tooth; and

a decorative article, characterized in that said milk tooth is adhered to be immovably fitted to become an integral part of said decorative article.

4,888,252

MOULD SETS FOR PLASTICS MOULDING MACHINES

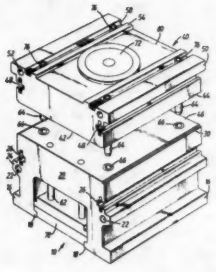
Rafael Kilim, 150 Coles Green Road, London NW2 7JL, England

Filed Dec. 22, 1988, Ser. No. 289,435

Claims priority, application United Kingdom, Aug. 6, 1986, 8619177

Int. Cl.[4] B29C *33/00*; B21C *23/14*

U.S. Cl. 428—582 **8 Claims**



1. A mould-set for use in producing a mould for injection moulding of plastics material, consisting essentially of:

a one piece cavity plate generally rectangular in cross-section and defining a generally planar working surface and made of high duty aluminum alloy which is extruded, cut off to length and subsequently finish-machined only, the cavity plate defining longitudinally extending external surface formations produced by the extrusion for clamping the cavity plate in position in use,

a one piece bottom plate having a main part of generally rectangular cross-section defining a generally planar working surface, the bottom plate being made of high duty aluminum alloy which is extruded, cut off to length and subsequently finish-machined only, the bottom plate defining longitudinally extending external surface formations produced by the extrusion for clamping the bottom plate in position and for supporting an ejector plate in use,

the cavity plate and the bottom plate being assembled together, with their working surfaces facing and parallel to each other such that a mould cavity may be machined in at least one said working surface to form a mould to a desired shape,

locating pins projecting from one of the working surfaces and engaging recesses in the other working surface so as positively to locate the two plates in relation to each other,

an ejector plate supported by the formations on the bottom plate on a side thereof opposite to the working surface, the ejector plate being made of high duty aluminum alloy which is extruded, cut off to length and subsequently finish-machined only, the ejector plate carrying ejector pins projecting into bores in the rectangular cross-section main part of the bottom plate,

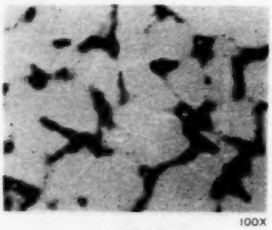
the ejector plate being movable towards the main part of the bottom plate such that the ejector pins slide within said bores and eject a moulded part in the mould cavity when machined in the said at least one working surface.

4,888,253

HIGH STRENGTH CAST+HIP NICKEL BASE SUPERALLOY

Sherman M. Snyder, West Hartford, and Edgar E. Brown, South Windsor, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 30, 1985, Ser. No. 814,695
Int. Cl.[4] B32B *15/00*
U.S. Cl. 428—680 **6 Claims**



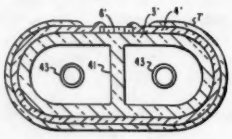
6. A welded, high strength cast article substantially free from weld cracks, consisting essentially of, by weight percent, 0.0–3.3 Mo, 15–24 Fe, 0.2–0.8 Al, 0.65–2.25 Ti, 5.5–6.5 Cb+Ta, 10–15 Cr, 0–6.5 W, balance Ni+Co.

4,888,254

LOW CIRCUMFERENTIAL VOLTAGE GRADIENT SELF SUPPORTING ELECTRODE FOR SOLID OXIDE FUEL CELLS

Philip Reichner, Plum Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 34,245, Apr. 6, 1987, abandoned. This application Jul. 19, 1988, Ser. No. 226,570
Int. Cl.[4] H01M *8/10*
U.S. Cl. 429—31 **7 Claims**



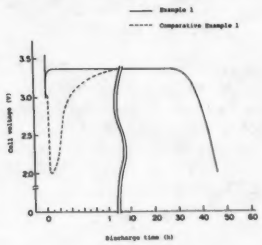
1. A porous, self-supporting, axially elongated electrode structure for a solid oxide electrolyte cell, where the electrode comprises a metal oxide material having at least two chambers through its axial length, the chambers separated by electrode material defining a structural member, said electrode structure having a contacting layer of solid electrolyte on its outer surface, and an outer layer of porous electrode on top of the electrolyte, where the outer electrode and the electrolyte have a discontinuity containing a narrow electronically conductive interconnect which extends an axial length along the self-supporting inner electrode, where electrons at points in the inner electrode farthest from the interconnect can travel to the interconnect through the structural member.

4,888,255

NON-AQUEOUS ELECTROCHEMICAL CELL

Kazumi Yoshimitsu, deceased, late of Ibaraki, Japan (by Mihoko Yoshimitsu, administratrix); Shintaro Sekido, Suita, Japan; Kenya Kazehara, Akoh, Japan; Kozo Kajita, Shiga, Japan, and Toshikatsu Manabe, Ibaraki, Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jun. 24, 1988, Ser. No. 210,927
Claims priority, application Japan, Jun. 24, 1987, 62-156948; Aug. 31, 1987, 62-218435
Int. Cl.[4] H01M *4/36, 6/16*
U.S. Cl. 429—101 **16 Claims**



1. A non-aqueous electrochemical cell comprising an anode containing an alkali metal as an essential component of the active anode material, a cathode collector comprising a carbonaceous porous shaped body and a cathode-electrolyte consisting of an ionically conductive solution of a solute in a solvent containing a liquid oxyhalide, characterized in that at least one of the electrolyte and the collector is incorporated with a carbocyclic aromatic compound having at least two benzene rings selected from the group consisting of naphthalene, anthracene, pyrene 1,2-benzanthracene, perylene, pentacene, triphenylene, benz(a)-pyrene, 1,2,3,4-dibenzanthracene, 1,2,5,6-dibenzathracene, benz(ghi)perylene and coronene.

4,888,256

SEPARATOR

David Zuckerbrod, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 21, 1988, Ser. No. 222,587
Int. Cl.[4] H01M *2/16*
U.S. Cl. 429—144 **13 Claims**

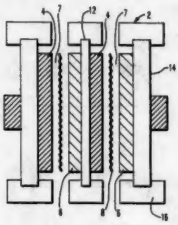
1. An intercell separator suitable for use in bipolar batteries comprising:

a first outer layer of composite of a electrically conductive substance and a hydrophobic polymeric substance;

a second inner layer of a porous hydrophobic composite catalyzed with a precious metal;

a third outer layer of a composite of a electrically conduc-

tive substance and a hydrophobic polymeric substance; and



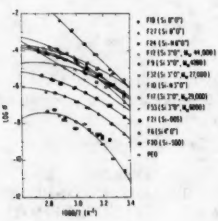
said first and third outer layers being laminated to said inner layer.

4,888,257

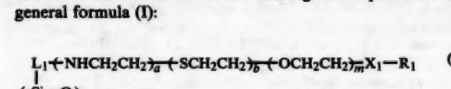
SOLID ELECTROLYTE

Subhash C. Narang, Redwood City, Calif., assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 28, 1989, Ser. No. 330,326
Int. Cl.[4] H01M *6/18*
U.S. Cl. 429—192 **11 Claims**



1. A solid electrolyte comprising a polymer containing therein at least 50 mol% of a recurring unit represented by general formula (I):



(I)

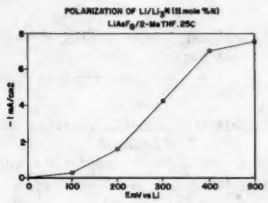
wherein L_1 and L_2 are each a divalent linking group; R_1 and R_2 are each hydrogen, an alkyl group, or an aryl group; m and p are each an integer of from 1 to 10; X_1 and X_2 are each —O— or —S—; n is an integer of from 10 to 100; a and b are each integers of from 0 to 10; and c is 0 or 1, provided that when c is 0, then a or b is at least 1, and a salt of a metal ion belonging to Group I or Group II of the Periodic Table.

4,888,258

LITHIUM-LITHIUM NITRIDE ANODE

C. David Desjardins; Hossein Sharifian, and Gregory K. MacLean, all of Fredericton, Canada, assignors to The New Brunswick Telephone Company, Limited, New Brunswick, Canada

Continuation-in-part of Ser. No. 24,358, Mar. 10, 1987, abandoned, and a continuation-in-part of Ser. No. 157,493, Feb. 17, 1988, abandoned. This application Mar. 17, 1988, Ser. No. 169,419
Int. Cl.[4] H01M *6/14, 4/58*
U.S. Cl. 429—194 **24 Claims**



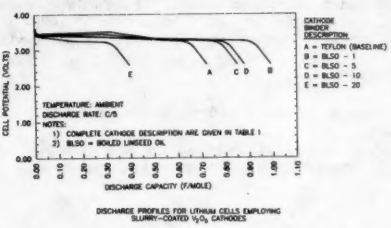
1. An electrochemical cell comprising:
(a) an anode comprising only a solid solution of lithium metal and lithium nitride;
(b) a cathode;
(c) a non-aqueous electrolyte comprising a solvent and a lithium salt dissolved therein; and
(d) a porous separator.

4,888,259

ELECTRODE COMPOSITION AND METHOD OF MAKING

Walter B. Ebner, Warminster, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 5, 1988, Ser. No. 279,890
Int. Cl.[4] H01M *4/62;* B05D *5/12*
U.S. Cl. 429—217 **20 Claims**



DISCHARGE PROFILES FOR LITHIUM CELLS EMPLOYING SLURRY-COATED V_2O_5 CATHODES

1. A cathode for an electrochemical cell comprising a thin metal current collector, a coating on said thin metal current collector consisting essentially of finely divided carbonaceous material and an amount of drying oil binder.

4,888,260

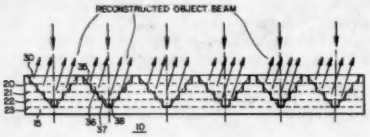
VOLUME PHASE REFLECTION HOLOGRAMS AND METHODS FOR FABRICATING THEM

James J. Cowan, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 10, 1987, Ser. No. 84,568
Int. Cl.[4] G03H *1/04*
U.S. Cl. 430—1 **10 Claims**

1. A volume phase reflection hologram comprising a volume phase medium having formed therein a surface relief structure

for use in wavefront reconstruction, said surface relief structure comprising a plurality of neighboring terraced depressions



whose terraces are located depthwise in said medium substantially at interference planes.

4,888,261

ELECTROPHOTOGRAPHIC PHOTSENSITIVE MEMBER

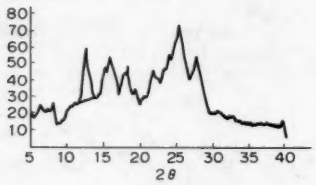
Minoru Mabuchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 25, 1988, Ser. No. 198,566

Claims priority, application Japan, Jun. 1, 1987, 62-137975

Int. Cl.[4] G03G *5/06*

U.S. Cl. 430—56 **7 Claims**



1. An electrophotographic photosensitive member comprising a conductive support, and a photosensitive layer containing an azo pigment as a charge-generating material, wherein in a powder X-ray diffraction pattern of the azo pigment contained in said photosensitive layer the ratio (X) of the diffracted beam intensity at a maximum peak of 2θ of from 5° to 20° to the X-ray intensity at the background is 0.8 or more, provided that:

$$X=(P-B)/B$$

P: X-ray intensity at a peak position at the maximum peak; and

B: X-ray intensity at a peak position on the line connecting the bottoms at the both sides of the maximum peak.

4,888,262

IMAGE FORMING METHOD

Kiyoshi Tamaki; Koichi Kudoh; Yoshihiko Etoh, and Yoshiaki Takei, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

PCT No. PCT/JP87/00490, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/00726, PCT Pub. Date Jan. 28, 1988

PCT Filed Jul. 9, 1987, Ser. No. 180,973

Claims priority, application Japan, Jul. 10, 1986, 61-162864; Jul. 10, 1986, 61-162865; Sep. 29, 1986, 61-233054

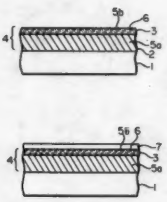
Int. Cl.[4] G03G *5/14*

U.S. Cl. 430—58 **15 Claims**

1. An improved electrophotographic image forming member comprising

a conductive substrate having provided thereon, in sequence, a photosensitive layer comprising a charge transporting layer containing a charge transporting material and a binder, and a charge generating layer containing a charge generating material, a charge transporting material, and a binder; and

a non-photosensitive layer containing a binder,



wherein the improvement comprises the incorporation of an antioxidant into at least one of said charge generating layer and said non-photosensitive layer.

4,888,263

COLOR TONER FOR ELECTROPHOTOGRAPHY

Masami Tomita; Yoshihiro Nomura, both of Numazu; Noriaki Ide, Fuji, and Kazumi Ohtaki, Numazu, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

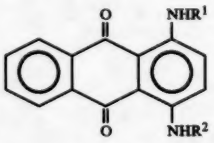
Filed Dec. 8, 1986, Ser. No. 939,382

Claims priority, application Japan, Dec. 19, 1985, 60-287317; Jan. 22, 1986, 61-10218

Int. Cl.[4] G03G *9/00*

U.S. Cl. 430—106 **23 Claims**

1. A color toner for electrophotography containing a coloring agent and a binder resin as the main components, said coloring agent comprising at least one of the anthraquinone derivatives having the formula (I),



(I)

wherein R^1 represents hydrogen or alkyl having at least 6 carbon atoms and R^2 represents hydrogen, alkyl having at least 6 carbon atoms or phenyl.

4,888,264

PROCESS FOR PREPARING TONER OR CAPSULE TONER FOR USE IN ELECTROPHOTOGRAPHY

Toru Matsumoto; Toshiyuki Koshio; Yasuhide Goseki, all of Tokyo; Hisayuki Ushiyama, Hiratsuka; Masuo Yamazaki, Kawasaki; Ichiro Ohsaki, Kawasaki; Toshiaki Nakahara, Kawasaki; Junichi Kurimoto, Tokyo, and Katsutoshi Wakamiya, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 767,866, Aug. 21, 1985, abandoned. This application Jun. 6, 1988, Ser. No. 205,540

Claims priority, application Japan, Aug. 31, 1984, 59-180477; Aug. 31, 1984, 59-180478

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—137 **23 Claims**

1. A process for preparing toner particles for use in electrophotography, comprising:

(a) heating a mixture of 1 to 2000 parts by weight of a colorant and 100 parts by weight of a binder containing 30% by weight or more of a compound having an aliphatic hydrocarbon long chain, said compound having a melt viscosity of 1 to 30 centipoises at 100° C.;

(b) stirring the heated mixture containing said binder in a molten state and substantially free of a liquid medium which is liquid at room temperature, in the presence of solid media for disintegrating an aggregate of said colorant in said mixture to obtain a uniform mixture;
(c) forming particles of the uniform mixture; and
(d) cooling said particles to obtain said toner particles.

4,888,265

LIGHT-SENSITIVE MICROCAPSULE CONTAINING POLYMERIZABLE COMPOUND AND SILVER HALIDE, AND LIGHT-SENSITIVE MATERIAL EMPLOYING THE SAME WHEREIN THE SILVER HALIDE IS EMBEDDED IN THE SHELL WALL COMPRISED OF POLYUREA OR POLYURETHANE

Fujio Kakimi, and Shunichi Ishikawa, both of Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 10, 1987, Ser. No. 24,114
Claims priority, application Japan, Mar. 10, 1986, 61-53872
The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.
Int. Cl.[4] G03C *1/72*
U.S. Cl. 430—138 **14 Claims**

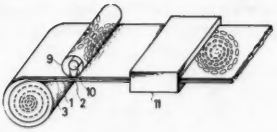
1. A light-sensitive microcapsule containing silver halide grains and an ethylenic unsaturated polymerizable compound wherein said ethylenic unsaturated polymerizable compound is enclosed with a shell comprising at least a resin selected from the group consisting of polyurea resin and a polyurethane resin, and wherein a portion of said silver halide grains are embedded in the shell.

4,888,266

PROCESS FOR PRODUCING INFORMATION SUPPORTS CAPABLE OF BEING OPTICALLY READ BY VARIATIONS IN ABSORPTION

Jean-Pierre Lacotte, and Claude Puech, both of Paris, France, assignors to Thomson Brandt, Paris, France

Continuation of Ser. No. 97,493, Nov. 26, 1979, abandoned, which is a continuation of Ser. No. 907,857, May 19, 1978, abandoned, which is a continuation of Ser. No. 683,245, May 4, 1976, abandoned. This application Mar. 13, 1987, Ser. No. 27,114
Claims priority, application France, May 7, 1975, 75 14331
Int. Cl.[4] G03C *5/18, 5/34, 5/00;* G01D *5/26*
U.S. Cl. 430—141 **7 Claims**



1. A process for producing an optically readable information support comprising the steps of:
providing a substrate;
providing on the first surface of the substrate an organic diazo compound layer having molecules decomposable by photolysis into nitrogen and a decomposition product, the layer having a thickness of less than a few micrometers;
providing a mask in contact with the diazo layer, the mask having opaque and transparent regions defining a video frequency signal angularly modulating a rectangular carrier, the transparent regions being on the order of one micrometer in width,
exposing portions of the diazo layer to light through the transparent regions of the mask, to dissociate molecules of the exposed portions, thereby creating regions of dissociated and non-dissociated molecules corresponding to the transparent and opaque regions of the mask, respectively, the exposing time being such that in the exposed zones about half of the organic diazo compound remains and the other half is decomposed by photolysis;
developing the diazo layer by placing a developing agent in contact with the diazo layer, the developing agent facilitating the combination of decomposed molecules of diazo compound with the diazo compound remaining in the exposed zones after the step of exposing to form a dye in the exposed zones; and as a final step,
metalizing the free surface for the diazo layer.

2. A process for producing an optically readable information support comprising the steps of:
providing a substrate;
providing on the first surface of the substrate an organic diazo compound layer including an organic diazo compound, a coupling compound and a stabilizing compound for preventing the coupling of the organic diazo compound with the coupling compound, the organic diazo compound being decomposable by photolysis into nitrogen and a decomposition product, the layer having a thickness of less than a few micrometers;
providing a mask in contact with the diazo layer, the mask having opaque and transparent regions defining a video frequency signal angularly modulating a rectangular carrier, the transparent regions being on the order of one micrometer in width,
exposing portions of the diazo layer to actinic radiation through the transparent regions of the mask, to dissociate the molecules of the exposed portions, thereby creating regions of dissociated and non-dissociated molecules corresponding to the transparent and opaque regions of the mask, respectively, the exposing time being such that in the exposed zones substantially all of the organic diazo compound is decomposed by photolysis;
developing the diazo layer by placing a developing agent in contact with the diazo layer, the developing agent acting on the stabilizing compound so as to permit a coupling reaction to take place between the organic diazo compound and the coupling compound step of exposing to form a dye in the non-exposed zones; and as a final step,
metalizing the free surface of the diazo layer.

3. A process for producing a replicate record from a master record comprising the steps of:
contacting said master record, comprising a record of information in the form of a record of a distribution of radiation transmissive apertures, at least some of which apertures therein have a cross sectional dimension of about 1 μm in size, with said replicate record comprising a light permeable substrate carrying a layer of a photosensitive material undergoing decomposition by photolysis,
exposing said replicate record through said master record with radiation that is actinic to said photosensitive material,
developing said replicate record to duplicate the information in the master record onto the replicate record in the form of a pattern providing variation in absorption of reading rays, and
finally, and subsequent to said developing step, overlaying said layer with metallization thereby allowing reflective readout of said replicate record through said substrate.

4,888,267

METHOD FOR PROCESSING A PHOTOGRAPHIC MATERIAL

Gino L. De Rycke, Mortsel, Belgium, assignor to AGFA-Gevaert N.V., Mortsel, Belgium

Filed Apr. 29, 1988, Ser. No. 187,917

Claims priority, application European Pat. Off., May 6, 1987, 87200834

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.[4] G03C 5/54, 5/38

U.S. Cl. 430—206 17 Claims

1. An ecologically clean method for processing an image-wise exposed photographic material having a silver halide emulsion layer which method comprises the steps of:

(A) developing said image-wise exposed photographic material by means of (a) at least one diffusible developing agent in the absence of such an amount of silver halide solvent or complexing agent that would reduce the coverage of developed silver metal (Ag/m2) by more than 20%, using an aqueous alkaline liquid,

(B) bringing the thus developed photographic material while being still wet with the liquid used in step (A) with its silver halide emulsion layer side into intimate contacat with a water-absorbing layer of a receptor element that contains in an organic hydrophilic colloid binder, a silver halide solvent or complexing agent, and in dispersed form silver metal nuclei,

(C) maintaining said photographic material and receptor element in said contact to allow the transfer of dissolved complexed silver compound into the water-absorbing layer of said receptor element until the undeveloped silver halide in the exposed silver halide emulsion layer is substantially completely removed and a silver metal precipitate on said nuclei is formed in the water-absorbing layer of said receptor element, and

(D) separating the photographic material from the receptor element, said water-absorbing layer containing said silver metal nuclei at a coverage of at least 0.1/g/m2, and said silver solvent or complexing agent at a coverage per m2 corresponding with at least 5 mole % of the molar coverage per m2 of silver halide in the unexposed photographic material.

15. Method according to claim 1, wherein the photographic material contains at least one dye image providing substance adapted for carrying out a dye diffusion transfer process and the receptor element contains also a mordanting agent for fixing a dye image provided by at least one such substance, such substance being transferred into said receptor element by image-wise diffusion from the developed photographic silver halide material.

4,888,268

SILVER HALIDE PHOTOGRAPHIC MATERIALS COMPRISING BLOCKED PHOTOGRAPHIC REAGANTS RELEASING PLUG GROUPS

Isamu Itoh; Mitsunori Ono, and Yoshio Inagaki, all of Minamiashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

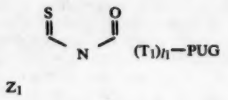
Continuation of Ser. No. 906,074, Sep. 11, 1986, abandoned. This application Aug. 16, 1988, Ser. No. 234,008

Claims priority, application Japan, Sep. 11, 1985, 60-200751; Oct. 4, 1985, 60-221295; Oct. 4, 1985, 60-221296; Dec. 18, 1985, 60-285348; Dec. 20, 1985, 60-287336

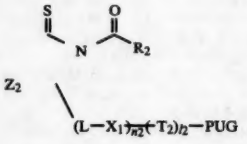
Int. Cl.[4] G03C 1/40, 1/48, 5/54

U.S. Cl. 430—218 22 Claims

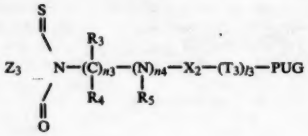
1. A method of processing an imagewise exposed silver halide photographic material, which comprises subjecting the photographic material (a) containing at least one blocked photographic reagent, which is at least one member selected from the group consisting of compounds of the general formulae (I) to (IV):



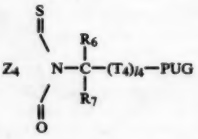
General formula (II):



General formula (III):

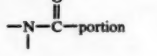


General formula (IV):



wherein PUG represents a photographically useful group; T_1, T_2, T_3 and T_4 independently represent a timing group; R_2, R_3, R_4, R_5, R_6 and R_7 independently represent a hydrogen atom or a substituent; X_1 and X_2 independently represent an electrophilic bond; L represents a connecting group; Z_1, Z_2, Z_3 and Z_4 independently represent a group of nonmetallic atoms forming a five- to seven-membered ring with or without a fused ring; Z_1 and Z_2 bieng connected to

via a sulfur atom, an oxygen atom, or a substituted imino group; and l_1, l_2, l_3, l_4, n_2, n_3 and n_4 are independently 0 or 1, provided that in general formula (III), n_3+n_4 is an integer of 1 to 3, and capable of releasing a photographically useful reagent by cleavage of the carbon to nitrogen bond in the



by nucleophilic attack of a nucleophilic reagent on the carbonyl group and subsequent intramolecular electron transfer reaction or intramolecular nucleophilic reaction and (b) having at least one photosensitive silver halide emulsion layer, to photographic processing in the presence of an amine.

4,888,269

RESIN COMPOSITION FOR SOLDER RESIST INK

Yoneji Sato; Masato Hoshino, both of Hachioji; Seiichi Kitazawa, Ichihara, and Tadashi Yasuda, Chiba, all of Japan, assignors to Dainippon Ink & Chemicals, Inc. and Asahi Chemical Research Laboratory, Ltd., both of Tokyo, Japan

Continuation of Ser. No. 882,407, Jul. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 778,794, Sep. 23, 1985, abandoned. This application Aug. 11, 1988, Ser. No. 231,606

Claims priority, application Japan, Jun. 29, 1985, 60-143,268; Jun. 29, 1985, 60-143,269; Jul. 4, 1985, 60-145,778; Jul. 4, 1985, 60-145,779

Int. Cl.[4] G03C *1/68*

U.S. Cl. 430—280 13 Claims

1. A resin composition for use in solder resist ink consisting essentially of:

(A) 100 parts by weight of a solution obtained by dissolving (A-a) an epoxy vinyl resin in (A-b) an organic solvent or (A-c) at least one photopolymerizable polyfunctional vinyl monomer selected from the group consisting of trifunctional or higher polyoxyalkylene glycol poly(meth-)acrylates, poly(meth)acrylates of polyoxyalkyl isocyanurates and poly(meth)acrylates of acetal compounds, wherein said epoxy vinyl ester resin (A-a) is obtained by reacting a phenol novolak-type epoxy resin or a cresol novolak-type epoxy resin with 0.40 to 0.80 mole, per epoxy group of the epoxy resin, of an unsaturated monobasic acid,

(B) 0.1 to 20 parts by weight of a photopolymerization initiator, and

(C) an amine-type curing agent in such a proportion that the number of active hydrogen in said curing agent (C) is 0.4 to 1.5 per remaining epoxy group of the epoxy vinyl ester resin (A-a), provided that when the curing agent (C) is dicyandiamine, a tertiary amine, an imidazole or an amine complex compound, the proportion of the curing agent (C) is 2 to 30 parts by weight per 100 parts by weight of the epoxy vinyl ester resin (A-a).

4,888,270

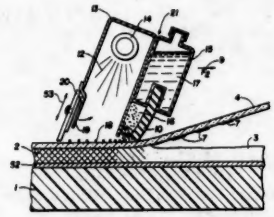
PHOTOPRINTING PROCESS AND APPARATUS FOR EXPOSING PASTE CONSISTENCY PHOTOPOLYMERS

Donald F. Sullivan, King of Prussia, Pa., assignor to M & T Chemicals Inc., Woodbridge, N.J.

Division of Ser. No. 147,776, May 8, 1980, Pat. No. 4,669,869. This application Jun. 2, 1987, Ser. No. 41,239

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—325 9 Claims



1. A process for mating two air-impermeable sheets in a sandwich with a liquid photopolymer layer therebetween comprising the steps of,

coating one said sheet with a layer of said photopolymer of predetermined thickness presenting a roughened surface, placing on of said two sheets on a smooth flat surface, disposing a second one of the two sheets comprising a flexible transparent sheet having a photo image on the surface thereof adjacent to and spaced slightly from a first sheet with the coating therebetween and the image facing the coating, and

scanning a member along the second sheet to force the uncoated one of said sheets into contact with the roughened photopolymer surface to remove air and smooth the coating surface into a coating of said predetermined thickness.

2. The process defined in claim 1, comprising the further steps of scanning a light source to follow said member and thereby expose and cure the photopolymer in a pattern produced by said photo image.

4. The process defined in claim 2 comprising the further step of removing one of said sheets and removing unhardened photopolymer by dissolving it.

4,888,271

METHOD OF TREATING PHOTORESISTS

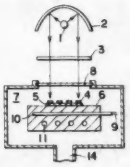
Shinji Suzuki, Kawasaki; Tetsuji Arai, Yokohama; Kazuyoshi Ueki, Kawasaki; Yoshiki Mimura, Yokohama, and Hiroko Suzuki, Kawasaki, all of Japan, assignors to Ushio Denki, Tokyo, Japan

Filed Jan. 22, 1988, Ser. No. 146,926

Claims priority, application Japan, Mar. 24, 1987, 62-67888

Int. Cl.[4] G03C *5/16*

U.S. Cl. 430—328 2 Claims



1. A method of enhancing thermal stability of a developed positive photoresist image on a semiconductor wafer comprising the steps of:

energizing a discharge lamp with electrodes to provide a range of radient energy including wavelengths of 300 nm to 500 nm,

selectively filtering wavelengths in the spectral response region of said photoresist image from said radiant energy,

placing the developed positive photoresist image in a chamber having a gas at a pressure lower than $1\times10-1$ torr atmospheric pressure, and exposing said photoresist image to the wavelengths remaining in said radiant energy after filtering step.

4,888,272

METHOD FOR PREPARING SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Seiichiro Kishida, and Minoru Sato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 31, 1988, Ser. No. 175,998

Claims priority, application Japan, Mar. 31, 1987, 62-79482

Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—569 11 Claims

1. A method for preparing a silver halide photographic emulsion comprising silver halide grains having silver halide protrusions on the surface of a silver halide grain matrix which comprises the steps of:

forming the silver halide grain matrix with a grain matrix composition comprised of AgBr, AgBrCl, AgBrI, or AgBrICl,

chemically sensitizing the silver halide grain matrix,

then forming the silver halide protrusions on the surface of the chemically sensitized silver halide grain matrix with a silver halide protrusion composition comprised of AgBr,

AgCl, AgBrCl, AgBrI, AgClI or AgBrClI, by employing a high silver potential of about +110 mV or more, to provide the protrusions with a size of 0.15 μm or less as the diameter of the projected area of the protrusions and to provide the protrusions in a number of from 10 to 10,000 per unit area (μm²) of the grain matrix, and

spectrally sensitizing the silver halide photographic emulsion.

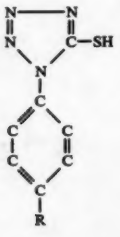
4,888,273

STABILIZED TABULAR SILVER HALIDE GRAIN EMULSIONS

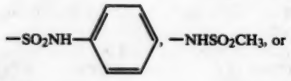
Richard S. Himmelwright, Melrose; Avinash C. Mehta, Belmont, and Lloyd D. Taylor, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 26, 1988, Ser. No. 160,710
Int. Cl.⁴ G03C *1/34*
U.S. Cl. 430—569 **7 Claims**

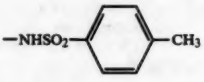
1. A method for stabilizing a photosensitive silver halide emulsion comprised of tabular silver halide grains having an aspect ratio of at least 5 which comprises adding to said emulsion during chemical sensitization a compound of the formula



wherein R is $-C(CH_3)=N-OH$, $-OH$, $-SO_2NHCH_3$,



$-NHSO_2CH_3$, or



and adding to said emulsion an azaindene subsequent to said chemical sensitization.

4,888,274

RECA NUCLEOPROTEIN FILAMENT AND METHODS

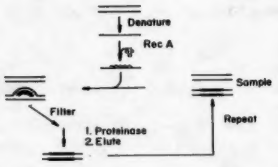
Charles M. Radding, Hamden; Saul M. Honigberg; Sherman Weissman, both of New Haven, all of Conn.; Basil Rigas, New York, N.Y.; Andrew A. Welcher, New Haven, and David C. Ward, Guilford, both of Conn., assignors to Yale University, New Haven, Conn.

Continuation-in-part of Ser. No. 777,233, Sep. 18, 1985, abandoned. This application Jan. 20, 1987, Ser. No. 5,470
Int. Cl.⁴ C12Q *1/68*; C07H *21/00*; C12N *15/00*
U.S. Cl. 435—6 **14 Claims**

1. A method of separating target and non-target duplex DNA molecules on the basis of a selected base sequence which is unique to the target sequence, comprising

providing stable, single-stranded nucleoprotein filaments, each composed of a single-stranded DNA probe having a region of homology with the selected base sequence, and RecA protein molecules bound stably to the DNA probe, in the presence of adenosine 5'-(γ-thio)triphosphate,

reacting the filaments with the target and non-target DNA molecules under conditions which promote rapid homologous alignment between the probe and homologous target base sequences in the reaction mixture, with formation of a stable filament/target complex,



contacting the reaction mixture with a solid support designed to selectively bind target molecules which are complexed with said filaments by such homologous alignment,

removing non-bound DNA molecules from the support, and

treating the support to release target DNA molecules which are selectively bound to the support through such complex formation.

4,888,275

DIAGNOSING AND MONITORING CANCER

Jan R. Holmgren, Stotekarrsvagen 11D, S-421 77 Vastra Frolunda; Leif Gustav Lindholm, Postlada 5603, S-430 31 Kullavik, and Lars T. Svennerholm, Fotbollsgatan 9, S-431 39 Molndal, all of Sweden

Continuation-in-part of Ser. No. 735,324, May 17, 1985. This application Nov. 20, 1987, Ser. No. 123,377
Claims priority, application Sweden, May 18, 1984, 8402702
Int. Cl.⁴ G01N *33/574, 33/577*
U.S. Cl. 435—7 **8 Claims**

1. A method of diagnosing or monitoring a patient suspected of having small cell carcinoma of the lung comprising:

(a) the determination in specimens of a specific cancer-associated antigen of carbohydrate nature, fucosylsialosylgangliotetraose (Fucα1-2Galβ1-3 GalNAc β1-4(NeuAcα2-3) Galβ1-4 Glc),

(b) relating the presence of said antigen to the presence of said carcinoma in said patient.

4,888,276

METHOD AND COMPOSITION FOR THE DIAGNOSIS OF LYME DISEASE

Charles E. Shelburne, Brooklyn Park, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 26, 1986, Ser. No. 879,153
Int. Cl.⁴ G01N *33/569, 33/577*
U.S. Cl. 435—7 **6 Claims**

1. A method for detecting the presence of the organism *Borrelia burgdorferi* comprising the steps of:

(a) combining a human urine sample or fraction thereof with antibodies specific for at least one antigen of said organism, wherein any of said antigen present in said urine binds to said antibodies to form an antigen-antibody complex; and

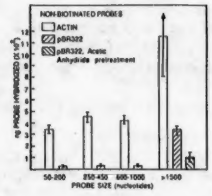
(b) detecting the presence of said complex.

4,888,278

IN-SITU HYBRIDIZATION TO DETECT NUCLEIC ACID SEQUENCES IN MORPHOLOGICALLY INTACT CELLS

Robert H. Singer, Shrewsbury, Mass., and Jeanne B. Lawrence, Mapleville, R.I., assignors to University of Massachusetts Medical Center, Worcester, Mass.

Continuation of Ser. No. 790,107, Oct. 22, 1985, abandoned.
This application Oct. 13, 1988, Ser. No. 257,198
Int. Cl.[4] C12N *15/00*; G01N *33/566, 33/552*
U.S. Cl. 435—6 3 Claims



1. A rapid in-situ hybridization method for detecting, with a non-homopolymer labelled nucleic acid probe, the absence or presence of a target nucleic acid sequence in morphologically intact cells, comprising the steps of:

contacting a sample of said cells with a fixative which preserves and retains the nucleic acids within the cellular morphology of said cells;

contacting the fixed cells with a non-homopolymer labelled probe for not substantially less than ten minutes and not substantially more than 24 hours under conditions whereby said labelled probe penetrates the morphologically intact cells and hybridizes to the target nucleic acid sequence to be detected, if present, said probe consisting essentially of nucleic acid fragments having from about 500 to about 1500 nucleotides and also having an identifying label thereon.

4,888,279

NOVEL IMMUNOSORBENT ASSAYS EMPLOYING ANTIBIOTIC KEYING AGENTS

Allen R. Zeiger, Philadelphia, Pa., assignor to Thomas Jefferson University, Philadelphia, Pa.

Continuation of Ser. No. 684,467, Dec. 21, 1984, abandoned.
This application Sep. 8, 1988, Ser. No. 243,185
Int. Cl.[4] G01N *33/53*
U.S. Cl. 435—7 20 Claims

1. A method for determining the presence of a molecular species in a liquid suspected of containing the species comprising:

attaching to a surface an antibiotic capable of binding specifically with the molecular species;

contacting the attached antibiotic with said liquid to effect binding of the species with the antibiotic;

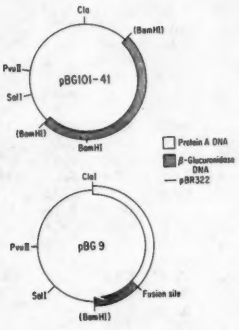
reacting the bound species with an antibody specific for the species; and reacting the bound antibody with a conjugate of an enzyme and a protein specifically bindable to said bound antibody and measuring the diminution of substrate or the increase in products of the operation of the attached enzyme thereby detecting the presence of said molecular species in said liquid.

4,888,280

HYBRID PROTEINS PRODUCED BY AN ULTRAHIGH PROKARYOTIC EXPRESSION

John L. Palmer, and Algis Anilionis, both of Arlington, Mass., assignors to Repligen Corporation, Cambridge, Mass.

Division of Ser. No. 686,342, Dec. 26, 1984, Pat. No. 4,691,009.
This application Aug. 25, 1986, Ser. No. 899,699
The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.
Int. Cl.[4] C12P *21/02*; C12N *15/00, 1/20, 1/00*
U.S. Cl. 435—69.7 36 Claims



1. A recombinant DNA transfer vector comprising DNA having the following nucleotide sequence or equivalent nucleotide sequences containing bases whose translated region codes for the same amino acid sequence:

GATCTGACCT ACGGTGTACT GGCCGATATC
GAAGCGGAAG ACCTGGCGCG TGAAGCGTCG
TTTGCTCAGG GATTACGCGC GATGATTGGC
GGTATCTTAA CCGCATCCTG ATTCTCTCTC
TTTTTCGGCG GGCTGGTGAT AACTGTGCCC
GCGTTTCATA TCGTAATTTC TCTGTGCAAA
AATTATCCTT CCCGGCTTCG GAGAATTCCC
CCCAAAATAT TCACTGTAGC CATATGTCAT
GAGAGTTTAT CGTTCCCAAT ACGCTCGAAC
GAACGTTCGG TTGCTTATTT TATGGCTTCT
GTCAACGCTG TTTTAAAGAT TAATGCGATC
TATATCACGC TGTGGGTATT GCAGTTTTTG
GTTTTTTGAT CGCGGTGTCA GTTCTTTTTA
TTTCCATTTC TCTTCCATGG GTTTCTCACA
GATAACTGTG TGCAACACAG AATTGGTTAA
CTAATCAGAT TAAAGGTTGA CCAGTATTAT
TATCTTAATG AGGAGTCCCTT

ATG	TTA	CGT	CCT	GTA	GAA	ACC
CCA	ACC	CGT	GAA	ATC	AAA	AAA
CTC	GAC	GGC	CTG	TGG	GCA	TTC
AGT	CTG	GAT	CGC	GAA	AAC	TGT
GGA	ATT	GAT	CAG	CGT	TGG	TGG
GAA	AGC	GCG	TTA	CAA	GAA	AGC
CGG	GCA	ATT	GCT	GTG	CCA	GGC
AGT	TTT	AAC	GAT	CAG	TTC	GCC
GAT	GCA	GAT	ATT	CGT	AAT	TAT
GCG	GGC	AAC	GTC	TGG	TAT	CAG
CGC	GAA	GTC	TTT	ATA	CCG	AAA
GGT	TGG	GCA	GGC	CAG	CGT	ATC
GTG	CTG	CGT	TTC	GAT	GCG	GTC
ACT	CAT	TAC	GGC	AAA	GTG	TGG
GTC	AAT	AAT	CAG	GAA	GTG	ATG
GAG	CAT	CAG	GGC	GGC	TAT	ACG
CCA	TTT	GAA	GCC	GAT	GTC	ACG
CCG	TAT	GTT	ATT	GCC	GGG	AAA
AGT	GTA	GCT	ATC	ACC	GTT	TGT
GTG	AAC	AAC	GAA	CTG	AAC	TGG
CAG	ACT	ATC	CCG	CCG	GGA	ATG
GTG	ATT	ACC	GAC	GAA	AAC	GGC
AAG	AAA	AAG	CAG	TCT	TAC	TTC
CAT	GAT	TTC	TTT	AAC	TCG	ATG
ACA	TTA	CTT	ATA	TCT	GGT	GGC

-continued

GTA	ACA	CCT	GCT	GCA	AAT	GCT
GCG	CAA	CAC	GAT	GAA	GCT	CAA
CAA	AAT	GCT	TTT	TAT	CAA	GTG
TTA	AAT	ATG	CCT	AAC	TTA	AAC
GCT	GAT	CAA	CGT	AAT	GGT	TTT
ATC	CAA	AGC	CTT	AAA	GAT	GAT
CCA	AGC	CAA	AGT	GCT	AAC	GTT
TTA	GGT	GAA	GCT	CAA	AAA	CTT
AAT	GAC	TCT	CAA	GCT	CCA	AAA
GCT	GAT	GCG	CAA	CAA	AAT	AAG
TTC	AAC	AAA	GAT	CAA	CAA	AGC
GCC	TTC	TAT	GAA	ATC	TTG	AAC
ATG	CCT	AAC	TTA	AAC	GAG	GAG
CAA	CGC	AAT	GGT	TTC	ATT	CAA
AGT	CTT	AAA	GAC	GAT	CCA	AGC
CAA	AGC	ACT	AAC	GTT	TTA	GGT
GAA	GCT	AAA	AAA	TTA	AAC	GAA
TCT	CAA	GCA	CCG	AAA	GCT	GAC
AAC	AAT	TTC	AAC	AAA	GAA	CAA
CAA	AAT	GCT	TTC	TAT	GAA	ATC
TTG	AAC	ATG	CCT	AAC	TTG	AAC
GAA	GAA	CAA	CGC	AAT	GGT	TTC
ATC	CAA	AGC	TTA	AAA	GAT	GAC
CCA	AGT	CAA	AGT	GCT	AAC	CTT
TTA	GCA	GAA	GCT	AAA	AAG	TTA
AAT	GAA	TCT	CAA	GCA	CCG	AAA
GCT	GAT	AAC	AAA	TTC	AAC	AAA
GAA	CAA	CAA	AAT	GCT	TTC	TAT
GAA	ATC	TTA	CAT	TTA	CCT	AAC
TTA	AAT	GAA	GAA	CAA	CGC	AAT
GGT	TTC	ATC	CAA	AGC	TTA	AAA
GAT	GAC	CCA	AGC	CAA	AGC	GCT
AAC	CTT	TTA	GCA	GAA	GCT	AAA
AAG	CTA	AAT	GAT	GCA	CAA	GCA
CCA	AAA	GCT	GAC	AAC	AAA	TTC
AAC	AAA	GAA	CAA	CAA	AAT	GCT
TTC	TAT	GAA	ATT	TTA	CAT	TTA
CCT	AAC	TTA	ACT	GAA	GAA	CAA
CGT	AAC	GGC	TTC	ATC	CAA	AGC
CTT	AAA	GAC	GAT	CCT	TCA	GTG
AGC	AAA	GAA	ATT	TTA	GCA	GAA
GCT	AAA	AAG	CTA	AAC	GAT	GCT
CAA	GCA	CCA	AAA	GAG	GAA	GAC
AAC	AAC	AAG	CCT	GGT	AAA	GAA
GAC	GGC	AAC	AAA	CCT	GGT	AAA
GAA	GAC	GGC	AAC	AAA	CCT	GGT
AAA	GAA	GAC	AAC	AAA	AAC	CTT
GGC	AAA	GAA	GAC	GGC	AAC	AAA
CCT	GGT	AAA	GAA	GAC	AAC	AAA
AAA	CCT	GGC	AAA	GAA	GAT	GGC
AAC	AAA	CCT	GGT	AAA	GAA	GAC
GGC	AAC	AAG	CCT	GGT	AAA	GAA
GAT	GGC	AAC	AAA	CCT	GGT	AAA
GAA	GAT	GGC	AAC	AAG	CCT	GGT
AAA	GAA	GAT	GGC	AAC	AAG	CCT
GGT	AAA	GAA	GAC	GGC	AAC	GGA
GTC	ATC	GAT	GAT	AAG	CTG	TCA
AAC	ATG	AGA	ATT	CTT	GAA	GAC
GAA	AGG	GCC	TCG.			

4,888,281

METHOD OF CATALYZING CHEMICAL REACTIONS

Gerald Schochetman, and Richard J. Massey, both of Rockville, Md., assignors to Igen, Inc., Rockville, Md.

Continuation-in-part of Ser. No. 556,016, Nov. 29, 1983. This application Nov. 27, 1984, Ser. No. 674,253

Int. Cl.[4] **C12P** *19/00, 19/34, 19/02, 13/22, 1/00;* **C12N** *9/10, 9/16, 9/22, 9/38, 15/00;* **C07K** *13/00*

U.S. Cl. 435—72 **27 Claims**

1. A method for catalyzing a chemical reaction wherein at least one reactant is converted to at least one product comprising the step of: contacting the reactant with at least one monoclonal antibody capable of catalytically increasing the rate of conversion of reactant to product in said chemical reaction, said contact being performed under conditions wherein a complex is formed between said monoclonal antibody and said reactant, the said reactant is catalytically converted to said product, and the said product is released from said complex, said monoclonal antibody having been produced by a process comprising the steps of:

(a) generating a plurality of monoclonal antibodies to an antigen selected from the group consisting of:

(i) the reactant,

(ii) the reactant bound to a peptide of other carrier molecule,

(iii) a reaction intermediate,

(iv) an analog of the reactant,

(v) an analog of the product in which the monoclonal antibody so generated is capable of binding to the reactant or a reaction intermediate, and

(vi) an analog of a reaction intermediate, and

(b) screening said plurality of monoclonal antibodies to identify a monoclonal antibody which catalyzes the reaction.

4,888,282

SYNTHETIC GENE FOR ACYL CARRIER PROTEIN

Phillips D. Beremand, Peoria, Ill.; John B. Ohlrogge, Okemos, Mich., and David N. Kuhn, West Lafayette, Ind., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C. and Purdue University, W. Lafayette, Ind.

Filed Jun. 4, 1987, Ser. No. 58,054

Int. Cl.[4] **C12N** *9/10, 15/00, 7/00, 1/20*

U.S. Cl. 435—193 **9 Claims**

1. A recombinant DNA which encodes spinach acyl carrier protein-I-Gly[76].

4,888,283

SELECTIVE INHIBITORS OF BENZYLAMINOXIDASES WITH RESPECT TO OTHER AMINOXIDASES

Vincenzo Bertini, Cosenza; Angela De Munno, Pisa; Francesco Lucchesini, Rende; Franca Buffoni, Florence, and Barbara Bertocci, Pistoia, all of Italy, assignors to Consiglio Nazionale Delle Ricerche, Rome, Italy

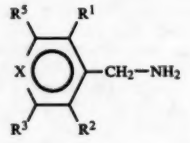
Division of Ser. No. 846,681, Apr. 1, 1986. This application May 11, 1988, Ser. No. 193,236

Claims priority, application Italy, Apr. 1, 1985, 47906 A/85

Int. Cl.[4] **A61K** *31/13;* **C07C** *85/00;* **C12N** *9/99;* **C07D** *213/60*

U.S. Cl. 435—184 **11 Claims**

1. A process for inhibiting the catalytic activity of at least one benzylaminoxidase in a material containing said benzylaminoxidase comprising contacting said material with a catalytic-inhibiting effective amount of a compound having the general formula



wherein

X is a C—R^4 group or a nitrogen atom;

R^1 and R^2, which can be the same or different from each other, represent a member selected from the group consisting of hydrogen, hydroxyl, alkoxyl, alkyl, alkenyl, hydroxyalkyl, hydroxyalkyoxyl phenoxyl, phenoxyalkyl, alkoxyalkyl, hydroxyalkoxyalkyl, alkoxyalkoxyl and hydroxyalkoxyalkoxyl groups, provided that no more than one of R^1 and R^2 is selected from the group consisting of hydrogen and hydroxyl, and

R^3, R^4 and R^5, which can be the same or different form each other, represent a member selected from the group consisting of hydrogen, hydroxyl, halogens, alkyl, alkoxyl, hydroxyalkyl, hydroxyalkoxyl, haloalkyl, alkyl-carbonyl,

ester, hydroxyalkoxyalkyl, carboxyl, amido, nitrile, sulfonic and nitro groups.

4,888,284

DIPEPTIDASE, ITS ISOLATION FROM LACTIC ACID BACTERIA, ANTIBODIES AGAINST THE DIPEPTIDASE, THE USE OF THE DIPEPTIDASE AND OF THE ANTIBODIES AGAINST IT

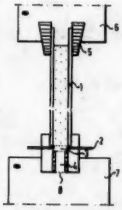
Willem N. Konings, Haren, and Aart van Boven, Groningen, both of Netherlands, assignors to Rijksuniversiteit te Groningen, Netherlands

Filed Mar. 31, 1988, Ser. No. 175,768

Claims priority, application Netherlands, Apr. 1, 1987, 8700767

Int. Cl.[4] C12N *9/00*

U.S. Cl. 435—183 **12 Claims**



1. Dipeptidase of lactic acid bacteria in isolated form, characterized by a molecular weight of 55 kD±5 kD; an isoelectric point of 4.4±0.4; a substrate range including the dipeptides leu-leu, leu-met, leu-val, leu-gly, val-leu, phe-leu and ala-ala, but not the dipeptides his-leu, γ-glu-leu, gly-leu, α-glu-ala and peptides of 3 or more amino acid residues; and a hydrolyzing activity with a temperature optimum at 50° C.±10° C., a pH optimum at 8±1, and sensitivity to the metal chelating EDTA and to the reducing agents dithiotreitol and mercaptoethanol.

4,888,285

ENZYME IMMOBILIZATION ON A WATER-INSOLUBLE AMINO GROUP-CONTAINING CARRIER

Yuusaku Nishimura; Masahiko Ishida, and Ryoichi Haga, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 7, 1987, Ser. No. 129,163

Claims priority, application Japan, Dec. 8, 1986, 61-290432

Int. Cl.[4] C12N *11/14, 11/02, 11/10*

U.S. Cl. 435—176 **20 Claims**

12. An immobilized enzyme produced by a method for immobilizing an enzyme on a water-insoluble carrier comprising the steps of:

(a) adding a phenolic carboxylic acid having one or more hydroxyl groups to an aqueous solution containing an enzyme;

(b) permitting said enzyme to be absorbed on said phenolic carboxylic acid;

(c) adding to the solution a water-insoluble amino group-containing carrier and a polyfunctional crosslinking agent;

(d) permitting said enzyme absorbed on said phenolic carboxylic acid to bind with said water-insoluble amino group-containing carrier through said polyfunctional crosslinking agent; and,

(e) recovering the resultant immobilized enzyme on a water-insoluble carrier from the aqueous solution.

4,888,286

PRODUCTION OF GENE AND PROTEIN ANALOGS THROUGH SYNTHETIC GENE DESIGN USING DOUBLE STRANDED SYNTHETIC OLIGONUCLEOTIDES

Roberto Crea, Burlingame, Calif., assignor to Creative BioMolecules, Inc., Hopkinton, Mass.

Continuation of Ser. No. 577,130, Feb. 6, 1984, abandoned. This application Mar. 24, 1987, Ser. No. 30,244

Int. Cl.[4] C12P *21/00, 21/02*; C12N *15/00*

U.S. Cl. 435—172.3 **11 Claims**

1. A method of altering the nucleotide sequence of native double-stranded DNA encoding a protein, to prepare synthetic double-stranded DNA capable of expressing an analog of said protein, said method comprising the steps of:

providing a synthetic double-standard DNA comprising a sequence of codons capable of expressing the amino acids of said protein and providing a plurality of non native restriction endonuclease sites;

digesting said synthetic double stranded DNA with a first restriction endonuclease having a first cleavage recognition site within said double stranded DNA;

digesting said synthetic double-stranded DNA with a second restriction endonuclease having a second cleavage recognition site proximate to said first site, whereby at least major and minor structural gene fragments are created; and

ligating to said major genre fragment a synthetic double-stranded oligonucleotide having termini complementary to said first and second cleavage sites, said synthetic double-stranded oligonucleotide having a nucleotide sequence distinct from the nucleotide sequence of said minor structural gene fragment.

4,888,287

RAPID DIFFERENTIATION OF FUNGI FROM BACTERIA USING POLYENE ANTIBIOTICS

Peggy W. Cichanowicz, Pittsford, and Robert T. Belly, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 24, 1986, Ser. No. 910,923

The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

Int. Cl.[4] C12Q *1/04*

U.S. Cl. 435—34 **20 Claims**

1. A composition for differentiating between viable fungi and bacteria comprising

(a) a dye or dye precursor capable of being reduced to a detectable species by both viable fungi and bacteria, and

(b) a polyene antibiotic which affects the cytoplasmic membrane, said antibiotic being present in an amount sufficient to selectively and substantially inhibit the reduction of said reducible dye or dye precursor by said fungi.

14. A method for differentiating between viable fungi and bacteria comprising the steps of:

A. mixing a first sample of a liquid suspected of containing viable fungi or viable bacteria with a dye or dye precursor capable of being reduced to a detectable species by both said fungi and said bacteria,

B. mixing a second sample of said liquid with

(a) said dye or dye precursor, and

(b) a polyene antibiotic which affects the cytoplasmic membrane, said antibiotic being present in an amount sufficient to selectively and substantially inhibit the reduction of said reducible dye or dye precursor by said fungi, and

C. measuring the difference between said detectable species resulting from steps A and B.

4,888,288

VESICLES RESISTANT TO ENZYME LYSIS AND USE THEREOF IN AN ENZYME ASSAY

Daniel B. Wagner, Raleigh, N.C., assignor to Becton Dickinson and Company, Franklin Lakes, N.J.

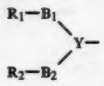
Filed Jan. 30, 1986, Ser. No. 824,362
Int. Cl.[4] C12Q *1/42*
U.S. Cl. 435—21 18 Claims

1. A product, comprising:

a liposome, said liposome being formed from a compound having the following structural formula:

X—L—A

wherein X is a hydrophobic radical of the formula:



wherein

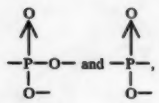
each of B_1 and B_2 is selected from the group consisting of —O— and CH_2;

R_1 and R_2 are each selected from the group consisting of hydrocarbon radicals having at least 11 carbon atoms, and

Y is a hydrocarbon radical having from 1 to 5 carbon atoms;

A is a hydrophilic radical; and

L is selected from the group consisting of:



wherein the negative valence of L is satisfied by a positive valence in said hydrophilic radical.

11. In an assay for analyte employing a tracer having an enzyme label wherein there is produced in the assay a bound fraction comprising tracer bound to a binder and a free tracer fraction, the improvement comprising:

contacting at least one of the bound and free tracer fraction with a liposome, said liposome being formed from a compound having the following structural formula:

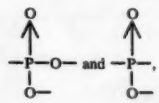
X—L—A

wherein

X is a hydrophobic radical;

A is a hydrophilic radical; and

L is selected from the group consisting of:



wherein the negative valence of L is satisfied by a positive valence in said hydrophilic radical, said liposome also including a detectable marker, said enzyme label being an enzyme which is bound by said liposome; and determining detectable marker of liposome bound to the tracer of at least one of the bound and free tracer fractions as a measure of analyte.

4,888,289

REAGENT FOR DETERMINING CREATINE KINASE

Tetuji Takami; Hiroyki Tsubota, and Hisashi Ochi, all of Chiba, Japan, assignors to Istron Laboratories, Inc., Tokyo and Unitaka Ltd., Hyogo, both of, Japan

Filed Oct. 27, 1986, Ser. No. 923,671
Claims priority, application Japan, Nov. 1, 1985, 60-244188
Int. Cl.[4] C12Q *1/48, 1/50, 1/32*
U.S. Cl. 435—15 6 Claims

1. In a reagent kit for use in the determination of creatine kinase containing creatine phosphate, ADP, glucose, HK or Gluk, NAD(P), G6PDH, magnesium salts, NAC and EDTA as essential components, based on the following reaction formulae 1, 2 and 3, the improvement which comprises having as separate reagents a reagent group containing at least a magnesium salt as the essential components and reagent group containing at least N-acetylcysteine and ethylenediaminetetraacetic acid as essential components, and the magnesium salt being separated from the group of the EDTA and NAC until the determination is carried out:

$$\text{Creatine Phosphate} + \text{ADP} \xrightarrow{\text{Creatine Kinase}} \text{Creatine} + \text{ATP} \quad (1)$$

$$\text{Glucose} + \text{ATP} \xrightarrow{\text{HK (or GluK)}} \text{Glucose-6-phosphate} + \text{ADP} \quad (2)$$

$$\text{Glucose-6-phosphate} + \text{NAD(P)} \xrightarrow{\text{Glucose-6-phosphate dehydrogenase}} \text{6-Phosphogluconate} + \text{NAD(P)H} \quad (3)$$

wherein ADP represents adenosine diphosphate, ATP represents adenosine, triphosphate, HK represents hexokinase, GluK represents glucokinase, NAD(P) represents beta-nicotinamide adenine dinucleotide (phosphate), NAD(P)H represents reduction type beta-nicotinamide adenine dinucleotide (phosphate).

4,888,290

MONOCLONAL ANTIBODY SPECIFIC TO HIV ANTIGENS

Kenneth H. Kortright, Cooper; David E. Hofheinz; Carole Sullivan, both of Miami, and Gary P. Toedter, Miramar, all of Fla., assignors to Coulter Corporation

Filed Nov. 6, 1987, Ser. No. 118,145
Int. Cl.[4] C12N *15/00;* G01N *33/567, 33/577*
U.S. Cl. 435—240.27 3 Claims

1. A hybridoma cell line which produces a monoclonal antibody which specifically binds to an epitope of the KC-57 antigen and is on deposit with the American Type Culture Collection, Rockville, Md., and assigned A.T.C.C. No. HB 9585.

4,888,291

HUMAN EPITHELIUM ORIGINATING FROM CELL CULTURES

Yann Barrandon, Boston, and Howard Green, Brookline, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Filed Jun. 19, 1987, Ser. No. 64,046
Int. Cl.[4] C12N *5/00*
U.S. Cl. 435—240.241 12 Claims

1. A method of growing an epithelial sheet comprising culturing disaggregated human keratinocytes and placing said human keratinocytes in direct contact with the living subdermal connective tissue of a living non-human animal, and main-

taining said connective tissue as living tissue in contact with dermis of said non-human mammal, said connective tissue being positioned between said human kertinocytes and said dermis of said non-human mammal.

4,888,292

DEODORANT AND METHOD FOR PREPARING AND STORING SAME

Kosei Hata, Osaka, Japan, assignor to Seikenkai, Osaka, Japan

Division of Ser. No. 604,417, Apr. 30, 1984, which is a continuation of Ser. No. 260,487, May 4, 1981, abandoned, which is a continuation of Ser. No. 799,319, May 23, 1977, abandoned. This application Jun. 13, 1984, Ser. No. 620,213

Int. Cl.[4] C12N *1/38, 1/36, 1/20, 1/04*

U.S. Cl. 435—244 **33 Claims**

1. A method for culturing a living autotrophic bacteria selected from the group consisting of FRI Nos. 2544, 2545, 2546, 2823, 3575, 3576, 3577 and 3578 for the deodorization of media which comprises culturing a living autotrophic bacteria selected from the group consisting of FRI Nos. 2544, 2545, 2546, 2823, 3575, 3576, 3577 and 3578 in a medium containing one or more S-, N- and C-containing compounds which are present as foul-smelling substances in excrement and/or an amino acid selected from the group consisting of cystine, cysteine, methionine, glycine, glutamic acid, alanine, aminobutyric acid, lysine, tyrosine and histidine, and for a time and under conditions sufficient to effect deodorization of said medium, said one or more S-, N- and C-containing compounds being present in an amount sufficient to accelerate the rate of growth of the bacteria when they enter the logarithmic phase relative to the rate of growth in the absence of said S-, N- and C-containing compounds and said amino acid being present in an amount sufficient to maintain the deodorizing ability of the bacteria.

4,888,293

ADAPTING BACTERIA TO LOW PH AND HIGH ARSENIC CONCENTRATION FOR USE IN OXIDIZING SULFIDE ORES

Ralph P. Hackl; Frank R. Wright, and Albert Bruynesteyn, all of North Vancouver, Canada, assignors to Giant Bay Biotech Inc., Burnaby, Canada

Filed Jul. 10, 1987, Ser. No. 71,968

Int. Cl.[4] C12N *1/36, 1/20;* C22B *1/11*

U.S. Cl. 435—245 **4 Claims**

1. A process for selectively preparing a bacterial culture which is specifically adapted to the oxidative leaching of those sulfide ores and concentrates which form elemental sulfur at low pH values and high concentrations of dissolved arsenic, comprising adapting a mixed culture of bacteria containing *Thiobacillus thiooxidans, Leptospirillum ferroxidans* and *Thiobacillus ferrooxidans* in the presence of a finely ground multi-metallic ore or concentrate by continuously culturing said bacteria at progressively lower pH values to a pH of 1 or less, concurrently with culturing at progressively higher arsenic concentrations.

4,888,294

APPARATUS AND METHOD FOR THE CONTINUOUS CULTIVATION OF MICROORGANISMS IN A CULTURE LIQUID

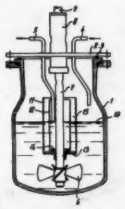
Antonius L. Van Wezel, deceased, late of Bilthoven, Netherlands (by Cornelia Maria Berendse); Hans H. De Haan, Bilthoven, and Stephan Vermeij, Nieuwegein, both of Netherlands, assignors to Nederlanden Vertegenwoordigd, Leidschendam, Netherlands

Continuation of Ser. No. 934,110, Nov. 24, 1986, abandoned. This application Oct. 21, 1988, Ser. No. 262,237

Claims priority, application Netherlands, Nov. 25, 1985, 8503245

Int. Cl.[4] C12M *1/02*

U.S. Cl. 435—316 **16 Claims**



1. Apparatus for the continuous cultivation of cells of a predetermined size of organisms selected from the group consisting of micro-organisms, and animal and vegetable cells, in a culture liquid, which apparatus contains a cultivation tank provided with a stirring device, an inlet for fresh cultivation medium, an outlet for used culture liquid, a rotating separating device comprising rotating parts for separating suspended cells or cell-carrying particles from culture liquid passed through the separating device which separating device is provided with a collecting space for culture liquid rendered essentially free of said cells into which the outlet for the culture liquid, rendered free of the cells, debouches, characterized in that the rotating parts of the separating device are formed in a manner such that, within the surface of revolution in which the outside circumference of the rotating parts rotates about an axis of rotation, a zone is formed containing a vortex-free axial rotating column of culture liquid from which the cells which are in suspension are thrown back by centrifugal forces into the surrounding culture liquid through openings in the outside circumference of the separating device which are considerably larger than the size of the cells to be separated, said openings being considerably larger than said predetermined cell size.

4,888,295

PORTABLE SYSTEM AND METHOD COMBINING CHROMATOGRAPHY AND ARRAY OF ELECTROCHEMICAL SENSORS

Solomon Zaromb, Hinsdale, and Joseph R. Stetter, Naperville, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

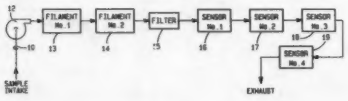
Continuation-in-part of Ser. No. 585,699, Mar. 2, 1984, Pat. No. 4,670,405. This application Jul. 2, 1986, Ser. No. 881,310

Int. Cl.[4] G01N *30/78*

U.S. Cl. 436—161 **20 Claims**

1. A system for analyzing a fluid sample including mixtures of components, comprising: chromatographic apparatus for achieving time-spaced separation of components of the sample, said chromatographic apparatus including a chromatographic column having an inlet and an outlet, means for introducing a carrier fluid to the inlet of said column, and means for introducing a fluid sample to the inlet of said column; detection means communicating with the outlet of said column for identifying and estimating the concentration of the components

eluting from said column, said detection means including an array of sensor means, said array including plural electrochemical sensor means having differing electrochemical responses to a given one of the eluted components or to a derivative thereof dependent on the chemical interaction of the component or a derivative thereof with each of said sensor means, and non-electrochemical conditioning means downstream of said colum for operating on the component so as to selectively alter the response thereto by said electrochemical sensor means; means for arranging all of the responses of all of said sensor means in said array of sensor means into a response pattern upon exposure to the component; means for providing a plurality of previously established response patterns including a previously established response pattern for identifying the component; and means for comparing the formed response pattern with at least one previously established response pattern to identify the component.



18. A method for analyzing a fluid sample including mixtures of components, comprising the steps of: passing the fluid sample through a chromatographic column for achieving time-spaced separation of components of the sample eluting from the column, introducing the eluted components to an array of sensors including plural electrochemical sensors having differing electrochemical responses to a given one of the eluted components or to a derivative thereof dependent upon the chemical interaction of the component or a derivative thereof with each of the sensors, operating on the component by non-electrochemical means downstream of the column so as to selectively alter the response thereto by the sensors, arranging all of the responses of all of the sensors in the array of sensors into a response pattern and comparing the formed response pattern with a set of previously established response patterns to identify the component.

4,888,296

MONOCLONAL ANTIBODIES RECOGNIZING L-THYROXINE

Gary R. Siebert, Raleigh, N.C., and Jean Armstrong, Bogota, N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Division of Ser. No. 631,048, Jul. 16, 1984, Pat. No. 4,636,478. This application Aug. 22, 1986, Ser. No. 899,115

Int. Cl.[4] G01N *33/53*; C12N *5/00*; A61K *39/395*

U.S. Cl. 436—500 **8 Claims**

1. A monoclonal antibody produced by a hybridoma cell line formed by fusion of cells from a mouse myeloma cell line with lymphocytes isolated from a mouse strain which has previously been immunized with L-thyroxine conjugated to a protein carrier, which monoclonal antibody:

reacts with L-thyroxine in an aqueous-based fluid when said L-thyroxine is present in said fluid at a concentration of 1.8 ng/ml to about 20 ng/ml

has an affinity for said L-thyroxine of no less

than 2.6 x 10^9 liters per mole and has a cross reactivity to triiodothyronine of no greater than 0.12%.

4,888,297

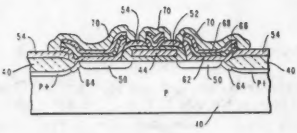
PROCESS FOR MAKING A CONTACT STRUCTURE INCLUDING POLYSILICON AND METAL ALLOYS

Mohamed O. Aboelfotoh, Poughkeepsie, and Yuk L. Tsang, Kingston, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 419,677, Sep. 20, 1982, abandoned. This application Oct. 20, 1987, Ser. No. 110,996

Int. Cl.[4] H01L *21/225, 21/283*

U.S. Cl. 437—41 **5 Claims**



1. A method of fabricating a field effect transistor integrated circuit structure wherein a layer of polycrystalline silicon is formed over a silicon body covered by a first layer of silicon dioxide, said polycrystalline silicon layer being masked in areas where a gate electrode is desired and etched in unmasked areas of said polycrystalline silicon, comprising the steps of:

forming a second layer of silicon dioxide over said masked and unmasked areas,

selectively etching said first and second silicon dioxide layers for exposing source and drain regions adjacent said gate electrode,

doping said exposed source and drain regions with a dopant,

forming a third layer of silicon dioxide over said source and drain regions and said gate electrode,

forming contact windows to said gate electrode, said source and drain regions, and said silicon body, wherein said contact window to said source and drain regions also expose portions of said silicon body,

forming a polycrystalline silicon layer over said gate electrode, said source and drain regions, and said exposed portions of said silicon body, wherein said polycrystalline silicon layer contacts exposed regions of said gate electrode, said source and drain regions, and said silicon body,

doping said polycrystalline silicon layer with an impurity, diffusing said impurity into said polycrystalline silicon layer and into said silicon body,

depositing a first refractory metal alloy layer over said polycrystalline silicon layer, said refractory metal alloy layer comprising approximately 10 to 30 percent by weight Tungsten,

depositing a second refractory metal alloy layer over said first refractory metal alloy layer, said second refractory metal alloy layer comprising at least 70 percent by weight Tungsten,

depositing an interconnect metal layer over said refractory metal alloy layers and,

heating said integrated circuit structure to a temperature of at least approximately 400 degrees Celsius but less than a temperature required to form a metallic silicide layer comprising silicon from either said polysilicon layer or said silicon body.

4,888,298

PROCESS TO ELIMINATE THE RE-ENTRANT PROFILE IN A DOUBLE POLYSILICON GATE STRUCTURE

Lydia L. Rivaud; Paul Roselle, both of Rochester, and David Losee, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 288,910

Int. Cl.[4] H01L *21/283, 29/78*

U.S. Cl. 437—43 **1 Claim**

1. A method of constructing a microelectronic device having overlapping poly-1 and poly-2 gate electrodes separated by

an insulating layer, and wherein the re-entrant profile is eliminated, comprising the steps of:

(a) forming a poly-1 gate electrode on a gate oxide layer on a substrate;

(b) oxidizing, for the first time, the poly-1 gate electrode to form a poly-oxide layer, wherein such oxidation causes the lifting of the edge portions of the poly-1 gate to form a re-entrant cavity;

(c) depositing an insulating sacrificial conformal layer on the poly-oxide layer;

(d) providing an anisotropic plasma etch to remove the oxide layer to expose the surface of the poly-1 gate electrode and to form a spacer formed partly of the gate oxide, poly-oxide, and insulating layers which fills the re-entrant profile in the poly-oxide; and

(e) oxidizing, for the second time, the poly-1 gate electrode and the substrate and forming overlapping poly-2 gate electrodes.

4,888,299

ROUTING AMONG FIELD EFFECT TRANSISTORS

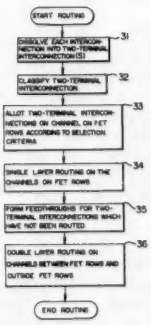
Yoichi Shiraishi, Higashimatsuyama; Junya Sakemi, Tokyo; Kunio Ono, Ome, and Ichiro Naka, Akishima, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corporation, both of Tokyo, Japan

Filed Feb. 21, 1989, Ser. No. 313,627

Claims priority, application Japan, Feb. 26, 1988, 63-42060

Int. Cl.[4] H01L *21/70*

U.S. Cl. 437—51 **5 Claims**


START ROUTING
DISSOLVE EACH INTERCONNECTION INTO TWO-TERMINAL INTERCONNECTION (S)
31
CLASSIFY TWO-TERMINAL INTERCONNECTION
32
ALLOT TWO-TERMINAL INTERCONNECTIONS ON CHANNEL ON FET ROWS ACCORDING TO SELECTION CRITERIA
33
SINGLE LAYER ROUTING ON THE CHANNELS ON FET ROWS
34
FORM FEEDTHROUGHS FOR TWO-TERMINAL INTERCONNECTIONS WHICH HAVE NOT BEEN ROUTED
35
DOUBLE LAYER ROUTING ON CHANNELS BETWEEN FET ROWS AND OUTSIDE FET ROWS
36
END ROUTING

1. A method of routing terminals of field effect transistors in a cell having at least two field effect transistor rows each having a fixed transverse length, channels on said field effect transistor rows where single wiring layer can be used, a channel sandwiched between each pair of said field effect transistor rows, and having a fixed transverse length where double wiring layers can be used, and channels outside the field effect transistor rows where double wiring layers can be used, by using a feedthrough or feedthroughs traversing across the field effect transistor row for interconnecting the routings in these channels and by interconnecting diffusion layers and gates which are the terminals of the field effect transistors, comprising the steps of:

dissolving given interconnections into two-terminal interconnections;

selecting as many two-terminal interconnections from said dissolved two-terminal interconnections as possible provided that the respective selected two-terminal interconnections do not cause any shortcircuit;

providing selection criteria of interconnection in routing on a wirable region of a channel on the field effect transistor row, selecting two-terminal interconnections to be routed in the channel on the field effect transistor row according to the criteria and routing the selected two-terminal interconnections;

making a feedthrough for a non-selected two-terminal interconnection and routing the non-selected interconnection; and

finally routing two-terminal interconnections in the channels where double wiring layers can be used.

4,888,300

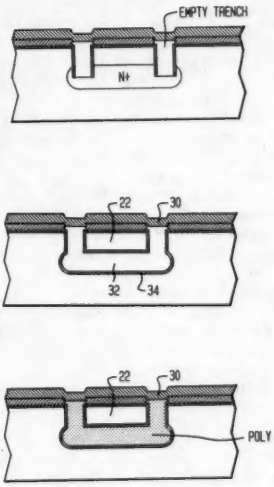
SUBMERGED WALL ISOLATION OF SILICON ISLANDS

Gregory N. Burton, Burlingame, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Nov. 7, 1985, Ser. No. 796,041

Int. Cl.[4] H01L *21/76, 21/302*

U.S. Cl. 437—61 **13 Claims**



1. A method for completely isolating a silicon island from its support substrate, comprising the steps of:

growing an epitaxial layer of single-crystalline silicon on a silicon substrate;

etching material around the border of a desired region of the epitaxial layer and beneath the desired region at the interface of the epitaxial layer and the substrate to form a cavity which completely separates the desired region from the substrate;

supporting the desired region of the epitaxial layer in place while etching the material beneath said region; and

introducing an insulating material into said cavity to provide an island of the epitaxial layer which is dielectrically isolated from the substrate.

4,888,301

METHOD FOR GENERATING A SUNKEN OXIDE

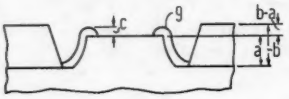
Hansjöerg Reichert; Ludwig Scharf; Heidemarie Goedecke, all of Munich, and Herbert Weidlich, Sauerlach, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

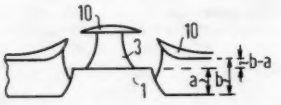
Filed Sep. 16, 1988, Ser. No. 245,853

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733020; Jul. 29, 1988, 3825894

Int. Cl.[4] H01L *21/76*

U.S. Cl. 437—72 **3 Claims**





1. A method for generating a sunken oxide comprising the following steps:

(a) covering a first region of a semiconductor surface with a protective layer which is greater than a subsequently desired non-oxidized region;

(b) etching the area of the semiconductor surface not covered with the protective layer until a semiconductor mesa is formed which has nearly the height (b) of the subsequently desired oxide layer;

(c) after removing the protective layer, depositing an oxide having a thickness (b) on the semiconductor surface in both the etched and non-etched areas;

(d) in a photolithographic step etching the deposited oxide in a third region encompassing the first region and being larger than the first region;

(e) thermally oxidizing the semiconductor surface to form a growth of a thermal oxide layer in the third region having a thickness (c) being small relative to the thickness (b) of the deposited oxide layer; and

(f) etching the thermal oxide layer to form the desired non-oxidized region on the surface of the semiconductor mesa.

4,888,302

METHOD OF REDUCED STRESS RECRYSTALLIZATION

Subramanian Ramesh, Ossining, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Continuation of Ser. No. 125,271, Nov. 25, 1987, abandoned. This application Mar. 29, 1989, Ser. No. 330,961

Int. Cl.[4] H01L *21/20, 21/324*

U.S. Cl. 437—82 **9 Claims**

1. A method of forming a thin, defect free, monocrystalline layer of a semiconductor material on an insulator, said method comprising:

(a) depositing a thin polycrystalline or amorphous layer of a semiconductor material on an insulating substrate to form a layered structure;

(b) focusing beams from an arc lamp and a filament lamp on the layer of semiconductor material in such a manner that the center of said beams coincide to form a line image on said line image, the power distribution on said layer being such as to provide a narrow melt zone in said layer of semiconductor material at the center of the line image surrounded by two narrow heated zones, the temperature of said narrow heated zones being below the temperature of said melt zone and said narrow heated zone having a temperature differential of from 2°–10° C./mm decreasing from said melt zone while scanning said layered structure relative to said line image and heating said substrate to a temperature below the temperature of said heated zone.

4,888,303

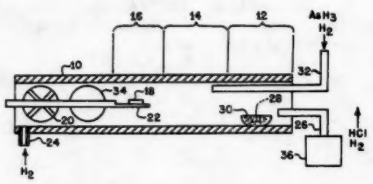
VAPOR PHASE EPITAXY-HYDRIDE TECHNIQUE WITH A CONSTANT ALLOY SOURCE FOR THE PREPARATION OF INGAAS LAYERS

Kenneth P. Quinlan, Newton, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 9, 1988, Ser. No. 269,225

Int. Cl.[4] H01L *21/20*

U.S. Cl. 437—81 **1 Claim**



1. A method for continuously preparing and depositing an epitaxial crystalline film comprised of a III–V compound onto the surface of a suitable substrate crystallographically compatable with said film, said method comprising the steps of:

(A) positioning a substrate suitable for epitaxial growth of III–V compounds on the surface thereof in a first zone located at one end of a reaction chamber while maintaining said first zone at a predetermined temperature of about 700° C;

(B) positioning a binary metal alloy source material composed of gallium and indium of a predetermined initial composition in a second zone located at the other end of said chamber while maintaining said second zone at a predetermined temperature of about 800° C;

(C) introducing a gaseous mixture composed of (a) hydrogen chloride and (b) a carrier gas into said heated second zone and passing said hydrogen chloride gas mixture over said binary metal alloy source material to produce a first gaseous reactant mixture formed by the reaction between said

hydrogen chloride and said binary metal alloy source material; said hydrogen chloride gas having an initial partial pressure being determined by the gallium atomic percent in the alloy source material and further being determined by the composition of the epitaxial film to be deposited;

(D) introducing said first gaseous reactant mixture into a third zone of said chamber, said third zone being maintained at a predetermined temperature of about 850° C. and positioned intermediate said first and second zones;

(E) introducing a second gaseous reactant into said third zone simultaneously with the entry of said first gaseous reactant mixture into said third zone, said second gaseous reactant comprising a mixture of (a) a hydride selected from the group consisting of phosphine, arsine, and stibine and (b) an inert carrier gas to form an admixture between said first gaseous reactant mixture and said second gaseous reactant;

(F) introducing said admixture into said heated first zone and contacting said substrate to affect the deposition of ternary epitaxial crystalline film thereof; and

(G) adjusting continuously as a function of time the partial pressure of HC1 gas to maintain the predetermined composition of the epitaxial layer as the gallium is depleted from the alloy source material.

4,888,304

METHOD OF MANUFACTURING AN SOI-TYPE SEMICONDUCTOR DEVICE

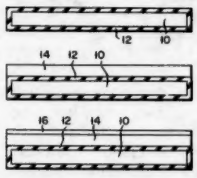
Kaoru Nakagawa, Hyogo; Yoshio Yamamoto, and Nobutaka Matsuoka, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 774,929, Sep. 11, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 943,862

Claims priority, application Japan, Sep. 19, 1984, 59-194600

Int. Cl.[4] H01L *21/20*

U.S. Cl. 437—86 **13 Claims**



1. A method of manufacturing an SOI-type semiconductor device, comprising the steps of:

preparing first and second monocrystalline semiconductor substrates of the same material, each of said first and second substrates having a top face and a bottom face;

providing said top face of said first substrate and said bottom face of said second substrate with a mirror finish;

thermally oxidizing said mirror-finished top face of said first substrate to provide said top face of said first substrate with a dielectric surface of a substantially uniform thickness;

stacking said first and second substrates on one another with said dielectric-surfaced top face of said first substrate in contact with said mirror-surfaced bottom face of said second substrate;

heating said stacked first and second substrates in an oxygen-containing atmosphere to bond said first and second substrates together; and

forming an epitaxial layer of semiconductor material on said top face of said second substrate after said heating step.

4,888,305

METHOD FOR PHOTO ANNEALING NON-SINGLE CRYSTALLINE SEMICONDUCTOR FILMS

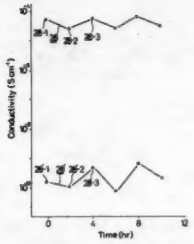
Shunpei Yamazaki, Tokyo; Kunio Suzuki, Atsugi; Susumu Nagayama, Tokyo; Takashi Inujima, Atsugi; Masayoshi Abe, Tama; Takeshi Fukada, Ebina; Mikio Kinka, Atsugi; Ippei Kobayashi, Atsugi; Katsuhiko Shibata, Atsugi; Masato Susukida, Atsugi, and Kaoru Koyanagi, Saku, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Continuation of Ser. No. 74,344, Jul. 14, 1987, abandoned, which is a division of Ser. No. 891,791, Aug. 1, 1986, abandoned. This application Mar. 9, 1989, Ser. No. 320,788

Claims priority, application Japan, Aug. 2, 1985, 60-170956; Aug. 23, 1985, 60-186372

Int. Cl.[4] H01L *21/20, 21/324*

U.S. Cl. 437—101 **4 Claims**



1. In a method of preparing non-single-crystalline semiconductor films, the steps comprising:

forming a non-single-crystalline semiconductor film including silicon and hydrogen on a substrate by plasma or photo CVD deposition of a gaseous compound of silicon and hydrogen;

effecting, under a vacuum, photo-annealing of said semiconductor film in order to regenerate dangling bonds by breaking the bonds between the silicon and hydrogen under said vacuum;

introducing a neutralizing agent selected from the group consisting of oxygen, fluorine, chlorine, and nitrogen after producing said dangling bonds to terminate the dangling bonds with the neutralizing agent.

4,888,306

METHOD OF MANUFACTURING A BIPOLAR TRANSISTOR

Shigeru Komatsu, Yokohama, and Hiroshi Inoue, Tokyo, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 750,224, Jun. 28, 1985, abandoned, which is a continuation of Ser. No. 690,831, Jan. 14, 1985, abandoned, which is a division of Ser. No. 361,083, Mar. 23, 1982, abandoned, which is a continuation of Ser. No. 76,857, Sep. 19, 1979, abandoned. This application Apr. 29, 1988, Ser. No. 188,625

Claims priority, application Japan, Sep. 26, 1978, 117433

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—162 **8 Claims**

1. A method for manufacturing a bipolar transistor device comprising the steps of:

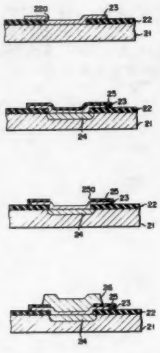
forming a first insulation layer on a semiconductor substrate;

forming a first opening in said first insulation layer to expose at least a portion of said semiconductor substrate corresponding to an emitter region;

forming a layer of polycrystalline silicon containing an impurity on said first insulation layer to fill said first opening in said first insulation layer and to cover portions of said first insulation layer surrounding said first opening, said layer of polycrystalline silicon having edges lying on said first insulaion layer and also having a peripheral portion

lying on said first insulation layer and including said edges;

heating said polycrystalline silicon layer under an oxidizing atmosphere to diffuse said impurity into said substrate to form said emitter region and to simultaneously form a second insulation layer by thermal oxidation of said polycrystalline silicon layer, said second insulation layer covering said edges and said peripheral portion of said polycrystalline silicon layer;



etching said second insulation layer at locations other than at said peripheral portion and said edges of said polycrystalline silicon layer;

depositing a metal layer on said first insulation layer and on said polycrystalline silicon layer at locations other than said peripheral portion of said polycrystalline silicon layer, said second insulation layer preventing the deposition of said metal layer on said peripheral portion and said edges of said polycrystalline silicon layer; and

selectively etching said metal layer for form a wiring layer extending onto said first insulation layer.

4,888,307

METHOD FOR MANUFACTURING PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES

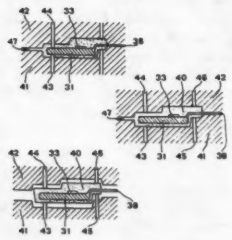
Antonio P. Spairisano, Palermo, and Marino Cellai, Agrate Brianza, both of Italy, assignors to SGS Microelettronica S.p.A., Catania, Italy

Filed Aug. 27, 1987, Ser. No. 90,142

Claims priority, application Italy, Aug. 27, 1986, 6611 A/86; Mar. 23, 1987, 19800 A/87

Int. Cl.[4] H01L *21/60, 21/449, 21/603*

U.S. Cl. 437—216 **2 Claims**



1. A method for manufacturing a plastic encapsulated semiconductor device which comprises

placing a semiconductor chip disposed on a metallic plate within a mold cavity, said metallic plate serving as both an electrode and as a heat sink, said metallic plate being provided at one end portion with a lead which extends from said mold cavity,

providing retractable ejector pins from opposite sides of the mold cavity and into contact with the opposite sides of the other end portion of the metallic plate,

introducing a polymerizable plastic material into mold cavity,

withdrawing the ejector pins before the plastic material begins to polymerize,

further introducing the polymerizable plastic material into the space vacated by the ejector pins, and

removing the encapsulated semiconductor device from the mold cavity.

2. A method for manufacturing a plastic encapsulated semiconductor device which comprises:

inserting a thermoplastic nail into at least one hole present in a plate supporting a semiconductor chip, said metallic plate serving as both an electrode and as a heat sink,

riveting the ends of said thermoplastic nail to fix the nail to the metallic plate,

placing said metallic plate and supported semiconductor chip within the cavity of a mold provided with at least a pair of clamping pins extending from opposite sides of the cavity and so located as to contact the opposite sides of said nail,

introducing a polymerizable plastic material into the mold cavity, and

removing the encapsulated semiconductor device from the mold cavity.

4,888,308

GLASS MANUFACTURE USING DENSE, UNSINTERED, GRANULAR ALKALINE EARTH METAL CARBONATES

Charles Adams, Jr., and Jerry A. Cook, both of Cartersville, Ga., assignors to Chemical Products Corporation, Cartersville, Ga.

Continuation-in-part of Ser. No. 13,071, Feb. 10, 1987, abandoned. This application Aug. 18, 1988, Ser. No. 233,376

Int. Cl.[4] C03C *3/00*; C01F *11/18*

U.S. Cl. 501—11 **28 Claims**

1. In the method of manufacturing glass objects in which a feedstock comprising silica, soda, lime, and an alkaline earth metal carbonate selected from the group consisting of barium carbonate and strontium carbonate is charged to a glass furnace, the feedstock is melted in the furnace, the molten mixture is removed from the furnace and formed in a mold, the improvement wherein the alkaline earth metal carbonate is a granular form of carbonate that has been prepared by

(a) forming a suspension of a precipitated form of the carbonate in water containing a water-soluble deflocculating agent that dissolves in molten glass without causing defects in the glass, said suspension containing at least about 35 volume percent of the carbonate and sufficient deflocculating agent to substantially completely deflocculate the carbonate;

(b) drying the resultant suspension at an elevated temperature so as to produce a substantially dry, granular product, at least about 80 weight percent of which has a particle size passing 10 mesh but not 150 mesh (Tyler), said drying being conducted without allowing the product to reach 400° C.; and

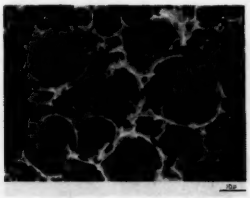
(c) heating the resultant granular product in a zone maintained at a temperature in the range of about 600° to 700° C. for a time long enough to increase the loose bulk density of the granular product by at least about 5 percent, but not for so long a time as to cause the product to sinter.

4,888,309

HYDROPHOBIC, HIGHLY POROUS, THREE-DIMENSIONAL INORGANIC STRUCTURES

Abraham Araya, Bebington, England, assignor to Unilever Patent Holdings BV, Rotterdam, Netherlands

Filed Oct. 16, 1987, Ser. No. 109,179
Claims priority, application United Kingdom, Oct. 16, 1986, 8624872
Int. Cl.[4] C04B *38/00*
U.S. Cl. 501—80 14 Claims



1. Three dimensional hydrophobic substantially inorganic porous structure having a void space in the form of a three-dimensional network of a myriad of cavities separated from each other by thin walls of inorganic material and interconnect by holes through said walls in which the diameters of the cavities are in the range of from 0.5 to 100 μm and the diameters of the holes are in the range of from 0.1 to 20 μm, the porosity of the structure having a narrow pore size distribution with the cavities having a pore volume of at least 2 cc/g for a 10 μm range of sizes, said inorganic material being selected from the group consisting of silicates, alumina, silica, titania, zirconia and mixture thereof and having been silylated by a silylating agent to render it hydrophobic.

4,888,310

PULVERULENT SILICON NITRIDE COMPOSITION INCLUDING OXIDIZED SILICON CARBIDE WHISKERS

Dominique Richon, Ville La Grand, France; Olivier De Pous, Rome, Italy, and Pierre Fontaine, Geneva, Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland

Filed Nov. 24, 1987, Ser. No. 124,597
Claims priority, application European Pat. Off., Nov. 25, 1986, 86810540.4
Int. Cl.[4] C04B *35/58*
U.S. Cl. 501—92 5 Claims

1. A silicon nitride pulverulent composition for making whisker reinforced sintered articles by high temperature sintering and/or hot isostatic pressing, this composition consisting essentially of in admixture:

(a) Si_3N_4 powder;

(b) from 2 to 15% by volume of SiC whiskers;

(c) a metal oxide densifying aid;

characterized in that, the SiC whiskers are superficially oxidized sufficiently to form a 2–20 nm layer of SiO_2.

4,888,311

CERAMIC-CERAMIC COMPOSITE MATERIAL AND PRODUCTION METHOD

Nicolas Davidovits, 6 Rue Brison, F-42300 Roanne; Michel Davidovics, 5 Route de Villers, F-60700 Pont Ste Maxence, and Joseph Davidovits, 16 Rue Galilee, F-02100 Saint Quentin, all of France

PCT No. PCT/FR87/00396, § 371 Date Jun. 10, 1988, § 102(e) Date Jun. 10, 1988, PCT Pub. No. WO88/02741, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 13, 1987, Ser. No. 218,286
Claims priority, application France, Oct. 14, 1986, 86 14224; Oct. 13, 1987, 87 14096
Int. Cl.[4] C04B *35/84, 35/16*
U.S. Cl. 501—95 9 Claims

1. In a process for the manufacture of a solid ceramic-ceramic material having reinforcing ceramic fibers and a ceramic matrix including a mineral polymer of alkaline polysilicate and alkaline polysialate, comprising the steps of obtaining said composite ceramic-ceramic material by hydrothermal polycondensation of said ceramic matrix in the presence of said reinforcing ceramic fibers and a filler, the improvement wherein the composite ceramic-ceramic material includes 30 to 60 parts by weight said reinforcing ceramic fibers and said reinforcing ceramic fibers are impregnated with said mineral polymer and said filler, said filler having dimensions lower than 5 microns and being selected from the group consisting of silica dust, alumina dust and micronized mica in such quantities that the mole ratios of oxides in the mixture of said mineral polymer and filler are within or equal to the following values:

M_2O/SiO_2:0.10 to 0.95

SiO_2/Al_2O_3: 2.50 to 6.00

M_2O/Al_2O_3:0.25 to 5.70

being Na or K;

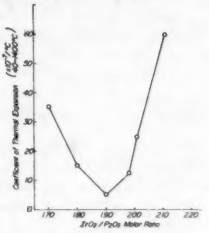
and wherein a mixture of said mineral polymer, said filler and said impregnated reinforcing ceramic fibers is hardened by polycondensation at a temperature between 20° and 120° C. to form said composite ceramic-ceramic material.

4,888,312

ZIRCONYL PHOSPHATE SINTERED BODIES AND PRODUCTION THEREOF

Keiichiro Watanabe, and Tsuneaki Ohashi, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed May 26, 1988, Ser. No. 199,145
Claims priority, application Japan, Jun. 5, 1987, 62-140050
Int. Cl.[4] C04B *35/48*
U.S. Cl. 501—102 9 Claims



1. A zirconyl phosphate sintered body having a molar ratio of ZrO_2/P_2O_5 of at least 1.8 and less than 2.0, said zirconyl phosphate comprising β-$(ZrO)_2P_2O_7$ as a main crystalline phase, wherein a coefficient of thermal expansion and a thermal expansion hysteresis in a temperature range from room temperature to 1,400° C. are not greater than 20×10^{-7}/° C. and 0.05 to 0.30%, respectively.

4,888,313

REFRACTORY CERAMICS FOR CONTACT WITH MOLTEN METAL

Richard W. Adams, Tewksbury, Mass., and Wen-Cheng J. Wei, Jamaica Plain, Mass., assignors to Ceramics Process Systems Corporation, Milford, Mass.

Filed May 5, 1988, Ser. No. 190,586
Int. Cl.[4] C04B *35/48*
U.S. Cl. 501—103 11 Claims

1. A process for making a refractory article, comprising:

(a) providing a slip having a solids portion consisting essentially of (i) about 80–99 wt. % dissociated zircon and (ii)

about 1-20 wt. % zirconia, the remainder of the slip including a vehicle and an amount of dispersant effective to disperse the solids portion in the vehicle;

(b) introducing an amount of the slip into a mold of a desired geometry;

(c) removing the vehicle form the slip to provide a green article; and

(d) sintering the green article at a temperature greater than the eutectic temperature t form a fired article including a silica phase, a zircon phase, and a zirconia phase.

4,888,314

LOW-TEMPERATURE SINTERABLE CORDIERITE TYPE CERAMIC POWDER, PREPARATION PROCESS AND CERAMIC COMPOSITION PRODUCED BY SINTERING THIS POWDER

Jean-Claude Bernier, Lingolsheim; Paul J. L. Poix, Lingolsheim; Jean-Luc Rehspringer, Griesheim Pres Molsheim; Gabriel G. J. Vilmin, Strasbourg, and Serge Vilminot, Strasbourg, all of France, assignors to Center National De La Recherche Scientifique (C.N.R.S.), Paris, France

Filed Jul. 11, 1986, Ser. No. 884,538

Claims priority, application France, Jul. 16, 1985, 85 10873

Int. Cl.[4] C04B *35/02*

U.S. Cl. 501—119 **25 Claims**

1. A process for the preparation of a consisting essentially of cordierite sinterable ceramic powder, which consists successively:

in preparing a mixed alcoholic solution of magnesium, aluminum and silicon salts, it being required that the said salts are soluble in alcohol or in a solvent which is miscible with alcohol,

in performing a vigorous stirring in order to obtain a homogeneous solution,

in adding a hydrolyzing agent in the form of a totally volatile weak base to the previous solution, which leads to the formation of a gel,

in treating thermally the gel obtained at a temperature not exceeding 450° C. for a period not exceeding 24 h which leads to the formation of a powder,

in treating thermally the powder obtained at a temperature of between 450° C. and 900° C. for a period not exceeding 6 h.

4,888,315

HIGH SOLIDS BLENDED KAOLIN CLAY SLURRY

James A. Bowman, Jeffersonville, and Ronald W. Andrews, Sandersville, both of Ga., assignors to Georgia Kaolin Company, Inc., Union, N.J.

Filed Jun. 4, 1986, Ser. No. 870,606

Int. Cl.[4] C04B *33/04*

U.S. Cl. 501—144 **2 Claims**

1. A kaolin product consisting of a blend in aqueous suspension of particles of a fractionated Tertiary kaolin of which at least 98% are of a particle size less than 2 microns and particles of a fractionated Cretaceous kaolin of which at least 60% are of a particle size less than 2 microns in an aqueous suspension, said Tertiary kaolin particles comprising at least 50% of the kaolin particles in said blend and said Tertiary kaolin particles and said Cretaceous kaolin particles comprising in combination at least 72% by weight of said aqueous blend, the resulting blend of said particles of fractionated Tertiary kaolin and said particles of fractionated Cretaceous kaolin consists of kaolin particles of which about 94% to 96% by weight of particles have a particle size of less than 2.0 microns, about 88% to 92% by weight of particles have a particle size of less than 1.4 microns, about 75% to 80% by weight of particles have a particle size less than 0.8 microns, and about 24% to 26% by weight of particles have a particles size of less than 0.2 microns.

4,888,316

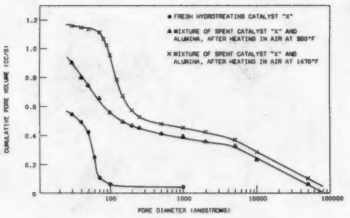
PREPARATION OF HYDROTREATING CATALYST FROM SPENT CATALYST

Lloyd E. Gardner, Bartlesville, and Dennis R. Kidd, Dewey, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 21, 1988, Ser. No. 274,156

Int. Cl.[4] B01J *21/20, 23/94, 23/92, 23/88*

U.S. Cl. 502—20 **32 Claims**



1. A process for preparing an active hydrotreating catalyst composition from a spent hydrotreating catalyst composition comprising the steps of:

(a) grinding a substantially dry spent hydrotreating composition comprising (i) an alumina-containing support material, (ii) at least one compound of at least one metal selected from the group consisting of molybdenum, tungsten, nickel and cobalt, and (iii) solid carbonaceous deposits;

(b) mixing the ground spent hydrotreating catalyst composition obtained in step (a) with alumina;

(c) shaping the mixture obtained in step (b) into compacted particles comprising said ground spent hydrotreating catalyst composition and said alumina; and

(d) heating the compacted particles obtained in step (c) in a free oxygen containing gas to a temperature in the range of from about 700° to about 1000° F., under such conditions as to substantially convert said solid carbonaceous deposits to carbon oxides, and to obtain an active hydrotreating catalyst composition.

4,888,317

CATALYST-AGGLOMERATE BODIES ENCAPSULATED IN A STRUCTURE AND METHOD FOR THEIR PRODUCTION

Thomas P. DeAngelis, Big Flats; Irwin M. Lachman, Corning, and Raja R. Wusirika, Painted Post, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Jul. 15, 1988, Ser. No. 219,984

Int. Cl.[4] B01J *32/00, 35/04*

U.S. Cl. 502—60 **24 Claims**

1. A hardened porous sintered structure comprising a single and/or a plurality of catalysts dispersed on and throughout a plurality of high surface area agglomerate bodies wherein said bodies are within the wall of the structure and/or protrude out of said wall and said bodies are integral with said structure.

4,888,318

CATALYST COMPOSITION FOR POLYMERIZING ALPHA-OLEFINS

Luanne M. Allen, Port Arthur, Tex.; Robert O. Hagerty, Edison, and Richard O. Mohring, Bridgewater, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 822,359, Jan. 24, 1986, Pat. No. 4,732,882.
This application Dec. 24, 1987, Ser. No. 138,235
The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.
Int. Cl.[4] C08F 4/64
U.S. Cl. 502—105 37 Claims

1. A process of preparing an alpha-olefin polymerization catalyst composition comprising the steps of:

(A) contacting a solution of a magnesium compound in a liquid with a titanium compound having the structure:

$$Ti(OR)_aX_b$$

wherein

R is an aliphatic or aromatic hydrocarbon radical of 1 to 14 carbon atoms, or COR' wherein R' is an aliphatic or aromatic hydrocarbon radical containing 1 to 14 carbon atoms;

X is Cl, Br, I or mixtures thereof;

a is 0, 1 or 2, b is 1 to 4, inclusive, and a+b=3 or 4;

(B) contacting the resulting solution of step (A) with a solid, inert porous carrier to form a catalyst precursor; and,

(C) contacting the precursor with trimethylaluminum.

4,888,319

SILICA-ALUMINA EXTRUDATES

Jacobus T. Daamen, and Tom Huizinga, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 11, 1988, Ser. No. 256,012
Claims priority, application United Kingdom, Oct. 19, 1987, 8724436
Int. Cl.[4] B01J 21/12, 21/00
U.S. Cl. 502—235 13 Claims

10. A process for the preparation of silica-alumina extrudates from a shapable dough which comprises mixing and kneading a particulate silica-alumina with water and with an alkanolamine to obtain a mixture having a total solids content of from 25 to 60% by weight, the alkanolamine being present in an amount of from 0.5 to 20% by weight on the total solids content of the mixture and extruding the mixture.

11. Silica-alumina extrudates whenever prepared by means of a process according to claim 10.

4,888,320

CATALYST AND METHOD OF MAKING THE CATALYST

Kazunori Ihara, Iwakuni; Hiromi Ohishi, and Shoko Yatagai, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 1, 1988, Ser. No. 226,733
Claims priority, application Japan, Jul. 31, 1987, 62-193519
Int. Cl.[4] B01J 21/04, 23/40, 32/00, 35/04
U.S. Cl. 502—304 10 Claims

1. A method of making a catalyst for cleaning exhaust gas from an engine including steps of preparing corrugated metallic panels and plane metallic panels, laminating the plane metallic panels with the corrugated metallic panels alternatively side by side to form a honeycomb structure of a metallic carrier, forming at least two layers of a base coat portion and an over coat portion of alumina based coating on the metallic carrier sequentially, and impregnating catalytic components into at least the outermost layer of the alumina based coating, said metallic carrier being dipped into an alumina slurry including γ-alumina, boehmite, nitric acid and water then dried and calcined to form the base coat portion of the layers of alumina based coating.

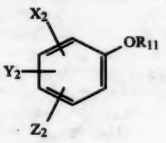
4,888,321

HEAT-SENSITIVE RECORDING MATERIALS

Hiroshi Kawakami; Akira Igarashi, and Ken Iwakura, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 21, 1988, Ser. No. 146,629
Claims priority, application Japan, Jan. 23, 1987, 62-13777; Mar. 9, 1987, 62-53483; Mar. 10, 1987, 62-54636; Mar. 11, 1987, 62-56325; Mar. 11, 1987, 62-56326
Int. Cl.[4] B41M 5/18
U.S. Cl. 503—208 3 Claims

1. A heat-sensitive recording material comprising a support having thereon a subbing layer mainly composed of a pigment and a binder, and a heat-sensitive recording layer containing a color former and a developer together with a binder, wherein said subbing layer and said heat-sensitive recording layer each contains a heat-fusible material having a melting point of at least 50° C., and wherein the heat-fusible material is a compound represented by one of the following formulae: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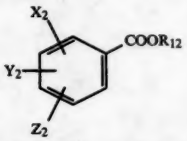
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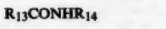
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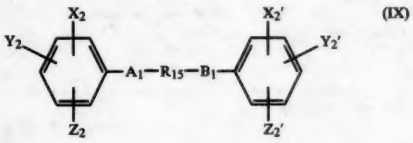

(IX)

wherein R_{11}, R_{12} and R_{13}, which may be the same or different, each represents an alkyl group or an aryl group; R_{14} represents a hydrogen atom, an alkyl group, or an aryl group; R_{15} represents a divalent group; A_1 and B_1, which may be the same or different, each represents O, CO, CO_2, or S; and X_2, Y_2, Z_2, X_2', Y_2' and Z_2', which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, a halogen atom, an alkoxycarbonyl group, an acyloxy group, or an alkylthio group; X_2 and Y_2 or X_2' and Y_2' may combine to form a ring.

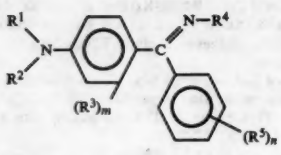
4,888,322

RECORDING MATERIAL CONTAINING LEUCO DYE

Naoki Saito, and Toru Harada, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 8, 1988, Ser. No. 229,681
Claims priority, application Japan, Jul. 8, 1987, 62-197740
Int. Cl.[4] B41M 5/16, 5/18; G03C 1/40, 1/72
U.S. Cl. 503—215 12 Claims

1. A recording material comprising a layer containing a leuco dye on a support, wherein the leuco dye has the formula (I):



(I)

in which each of R^1 and R^2 independently is a monovalent group selected from the group consisting of an alkyl group, a cycloalkyl group and an aryl group, or R^1 and R^2 may form, together with the neighboring nitrogen atom, a heterocyclic ring; R^3 is a monovalent group selected from the group consisting of a halogen atom, an alkyl group, an aryl group, an alkoxy group and an aryloxy group; R^4 is a monovalent group selected from the group consisting of an aryl group and a hetrocyclic group; R^5 is a monovalent group selected from the group consisting of a halogen atom, an acyloxy group, an acyl group, carbamoyl, sulfamoyl, an alkylsulfonylamino group, an arylsulfonylamino group, an acylamino group, amino, hydroxyl, nitro, cyano, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkylsulfonyl group and an arylsulfonyl group; each of R^1, R^2, R^3, R^4 and R^5 may have one or more substituent groups; m is 0 or 1; n is 0, 1, 2, 3, 4 or 5; when n is 2, 3, 4 or 5, the groups represented by R^5 may be different from each other.

4,888,323

PERFUME COMPOSITION

Hiroyuki Matsuda, and Takeshi Yamamoto, both of Tokyo, Japan, assignors to Takasago International Corporation, Tokyo, Japan

Filed Jun. 21, 1988, Ser. No. 209,396
Claims priority, application Japan, Jun. 22, 1987, 62-153440
Int. Cl.[4] A61K 7/46
U.S. Cl. 512—23 7 Claims

1. A perfume composition which contains 2,4-di-tert-butylcyclohexanone.

4,888,324

METHOD FOR ENHANCING ANGIOGENESIS WITH LIPID CONTAINING MOLECULES

Nicholas Catsimpoolas, Newton Centre; Robert McCluer, Acton, both of Mass.; Robert S. Sinn, New York, N.Y., and James Evans, Winchester, Mass., assignors to Angio-Medical Corporation, New York, N.Y. and Trustees of Boston University, Boston, Mass.

Continuation of Ser. No. 782,724, Oct. 1, 1985, Pat. No. 4,710,490. This application Nov. 2, 1987, Ser. No. 116,014
Int. Cl.[4] A61K 31/70, 31/685
U.S. Cl. 514—25 22 Claims

1. A process for obtaining a composition with enhanced angiogenic acitivity comprising containing a sample of mammalian tissue with a first solvent under conditions favoring extraction of angiogenically active lipid containing molecules selected from the group consisting of phospholipids, ceramides, cerebrosides, neutral lipids, triglycerides, diglycerides, monoglycerides lecithin and sphingosides into said first solvent and further contacting said angiogenically active lipid containing first solvent with a second solvent under conditions favoring extraction of said angiogenically active lipid containing molecules but not angiogenic inhibiting substances, said first and second solvents being insoluble in each other.

4,888,325

CONTROLLING PLANT PESTS WITH COMPOSITIONS CONTAINING ALKYL GLYCOSIDE

Peter Schroeder, Viersen; Hans Bouten, Geldern, and Manfred Biermann, Muelheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 23, 1986, Ser. No. 945,923
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545908
Int. Cl.[4] A01N 43/16
U.S. Cl. 514—25 18 Claims

1. A method for treating plants to control plant pests comprising applying to the locus of the pest a pest controlling quantity of a wax free composition containing at least one alkyl glycoside having the formula

$$(H(\text{-glyc})_nR)(EO)_m \qquad (I)$$

wherein (-glyc) is the residue of a monosaccharide, n is a number of from 1 to 6, R is a primary C_8–C_{22} alkyl or alkenyl group attached to the (-glyc) group by a glycoside bond, EO is the ethyleneoxy group, and m is a number of from 0 to 100.

4,888,326

METHOD OF TREATING DEFECTIVE T-LYMPHOCYTE FUNCTION WITH RUTIN OR TROXERUTIN IN COMBINATION WITH γ-LINOLENIC ACID OR DIHOMO-γ-LINOLENIC ACID

David F. Horrobin, Montreal, Canada, assignor to Efamol Ltd., London, England

Filed Mar. 4, 1988, Ser. No. 168,603
Claims priority, application United Kingdom, Apr. 29, 1982, 8212433
Int. Cl.[4] A61K 31/70
U.S. Cl. 514—27 2 Claims

1. A method of treating defective T-lymphocyte function comprising administering to a person requiring same effective amounts of rutin or troxerutin with gamma-linolenic acid or dihomo-gamma-linolenic acid.

4,888,327

TOPICAL ANTIBIOTIC COMPOSITIONS

John G. Edwards, Cleburne, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 18,330, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 659,352, Oct. 10, 1984, abandoned. This application Aug. 4, 1988, Ser. No. 228,621
Int. Cl.[4] A61K 31/70, 31/635, 31/505
U.S. Cl. 514—41 2 Claims

1. A method of treating ophthalmic bacterial infections in humans which comprises applying topically to an infected eye a therapeutically effective amount of an ophthalmic composition comprising tobramycin, trimethoprim and sulfamethoxazole, wherein the weight ratio of tobramycin trimethoprim and sulfamethoxazole is in the range of 0.1 to 10: 1 to 10: 2 to 20.

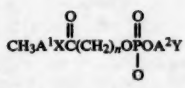
4,888,328

ALKOXYCARBONYLALKYLPHOSPHOLIPIDS AND ALKYLAMINOCARBONYLALKYLPHOSPHOLIPIDS

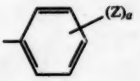
Nicholas J. Hrib, Somerville; Kirk D. Shoger, Piscataway, and John J. Tegeler, Bridgewater, all of N.J., assignors to Hoechst-Roussel Incorporated, Somerville, N.J.

Filed Mar. 10, 1988, Ser. No. 166,285
Int. Cl.[4] C07F 9/65, 9/09; A61K 31/675, 31/66
U.S. Cl. 514—91 11 Claims

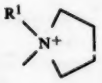
1. A compound of the formula



where A^1 is a bivalent radical of the formula $—C_mH_{2m}—$ wherein m is an integer having a value from 0 to 20, inclusive, A^2 is a bivalent radical of the formula $—C_pH_{2p}—$ wherein p is an integer having a value from 2 to 6, inclusive; X is a bivalent radical of the formula —O— or —N(R)— wherein R is selected from the group consisting of hydrogen, alkyl radicals having up to 6 carbon atoms, inclusive and phenyl radicals of the formula



wherein a is an integer having a value from 0 to 3, inclusive, and Z is selected from the group consisting of alkyl radicals having 1 to 6 carbon atoms, inclusive, alkoxy radicals having 1 to 6 carbon atoms inclusive, halogen, hydroxy and trifluoromethyl radicals, wherein for each value of a, Z may be the same or different; Y is



wherein R^1 is an alkyl radical having 1 to 6 carbon atoms, or optical antipodes thereof.

3. A pharmaceutical composition comprising an effective inflammation alleviating amount of a compound as defined in claim 1 and a suitable carrier therefor.

4,888,329

ANTIULCER COMPOSITION

Kazumi Ogata, Toyonaka; Takahiro Ogawa, Nishinomiya, and Takahiro Sakaue, Itami, all of Japan, assignors to Senju Pharmaceutical Co., Ltd., Osaka, Japan

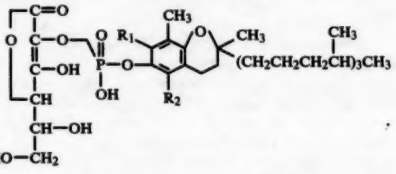
Filed Apr. 27, 1988, Ser. No. 187,032

Claims priority, application Japan, Apr. 28, 1987, 62-106077

Int. Cl.[4] A61K *31/665*

U.S. Cl. 514—100 **1 Claim**

1. A method for the treatment of peptic ulcer, which comprises administering orally or parenterally to a patient in need of such treatment an antiulcer effective amount of a compound of the formula or a pharmaceutically acceptable salt thereof



wherein R_1 and R_2 each represent hydrogen or methyl.

4,888,330

METHOD FOR CONTROLLING PHYTOPATHOGENIC FUNGI USING BRANCHED AMINOALKANEPHOSPHONIC ACIDS

David G Cameron, Stockholm, Sweden; Harry R. Hudson, London, England; Inger Lagerlund, Bromma, Sweden, and Max Pianka, Middlesex, England, assignors to KenoGard AB, Nacka, Sweden

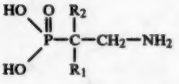
Continuation of Ser. No. 851,211, Apr. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 695,227, Jan. 28, 1985, abandoned. This application Jun. 10, 1988, Ser. No. 207,921

Claims priority, application Sweden, Jan. 30, 1984, 8400438

Int. Cl.[4] A01N *57/00, 57/26*

U.S. Cl. 514—114 **6 Claims**

1. A method for controlling phytopathogenic fungi, which method comprises applying to seed as a seed dressing agent or to foliage as foliar spray a fungicidally effective amount of an aminoalkanephosphonic acid of the formula



wherein R_1 is an alkyl group having 1 to 12 carbon atoms, and R_2 is an alkyl group having 1 to 12 carbon atoms, or fungicidally effective salts of the aminoalkanephosphonic acids.

4,888,331

COADMINISTRATION OF ANTIGESTAGEN AND ANTIESTROGEN FOR GYNECOLOGICAL DISORDERS, ABORTION AND LABOR INDUCTION

Walter Elger; Sybille Beier; Marianne Fähnrich; Beate Kosub; Krzysztof Chwalisz, and Syed H. Hasan, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 252,299

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1987, 3733478

Int. Cl.[4] A61K *31/56*

U.S. Cl. 514—170 **19 Claims**

1. A method for the induction of labor, termination of pregnancy or the treatment of gynecological disorders comprising administering to a patient in need of such an effective amount of an agent comprising at least one compound having antiprogestational activity (AG) and at least one compound having anti-estrogenic (AE) activity.

4,888,332

CEPHALOSPORIN DERIVATIVES

Haruo Ohnishi, Funabashi; Hiroshi Kosuzume, Mishima; Masahiro Mizota, Gotenba; Yasuo Suzuki, Kawaguchi, and Ei Mochida, Tokyo, all of Japan, assignors to Mochida Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1984, Ser. No. 687,455

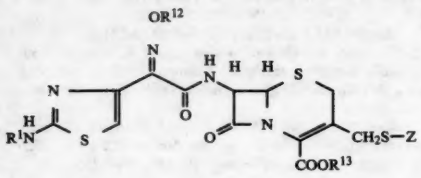
Claims priority, application Japan, Dec. 29, 1983, 58-247251

The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.

Int. Cl.[4] C07D *501/36*; A61K *31/545*

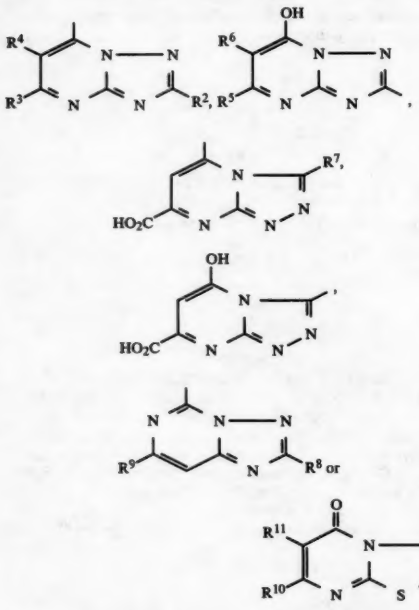
U.S. Cl. 514—206 **94 Claims**

1. A compound of the formula (I):



(I)

and salts, hydrates and hydrates of salts of said cephalosporin compound; wherein R^1 represents a hydrogen atom or an amino-protecting group; Z represents:



wherein R^2 represents a hydrogen atom, a methyl group, an amino group, a cyano group, a hydroxysulfonyl group, a carboxyl group, a carboxymethyl group, a protected carboxyl group, a protected carboxymethyl group, a methoxycarbonyl group or a hydrazino carbonyl group; R^3 represents a hydrogen atom, an alkyl group having 1 to 3 carbon atoms, a hydroxy group, a methoxy group, a carboxyl group, a carboxymethyl group or a chlorine atom; R^4 represents a hydrogen atom, a methyl group or a carboxyl group; R^5 represents a hydrogen atom or a methyl group; R^6 represents a hydrogen atom, a carboxyl group, an ethoxycarbonyl group or a piperidinocarbonyl group; R^7 represents a hydrogen atom or a methyl group; R8 represents a hydrogen atom or a carboxyl group; R^9 represents a methyl group, an amino group or a carboxyl group; R^{10} represents a hydrogen atom or a methyl group; R^{11} represents a hydrogen atom or a carboxyl group; R^{12} represents a hydrogen atom, a methyl group, a hydroxyl-protecting group, a cyanomethyl-thioacetyl group a monocyclic carbocyclic aromatic acyl group which may be substituted by protected or non-protected hydroxy groups or a mono- or dicyclic heterocyclic aromatic acyl group; R^{13} represents a hydrogen atom or a carboxyl-protecting group; and a wavy line represents a bond of anti-form or of syn-form.

4,888,333

ALLYMERCAPTOACETYLSYDNONIMINES, PROCESSES FOR THEIR PREPARATION, AND THEIR USE

Helmut Bohn; Melitta Just, both of Schöneck, and Rolf-Eberhard Nitz, Frankfurt, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

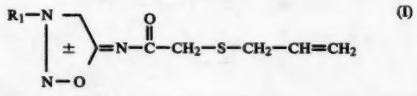
Continuation of Ser. No. 133,543, Dec. 16, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,846

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1987, 3702083

Int. Cl.[4] C07D *271/04, 413/04;* A61K *31/41*

U.S. Cl. 514—212 **6 Claims**

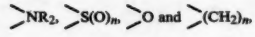
1. Allylmercaptoacetylsydnonimines of the general formula I



(I)

in which R_1 is a secondary amino radical selected from the group consisting of

and X is a radical selected from the group consisting of



R_2 is a radical selected from the group consisting of R_3OOC—, R_4SO_2—, and alkyl having 1–4 C atoms, n denotes one of the values 0, 1 or 2, and R_3 is an alkyl radical having 1–4 C atoms, and R_4 is a radical selected from the group consisting of R_3 and $(R_3)_2N$—, and their pharmacologically acceptable salts.

4,888,334

PRESSURE-SENSITIVE MICROCAPSULE SHEET

Kunihiko Ohga, and Keiso Saeki, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 19, 1988, Ser. No. 183,104

Claims priority, application Japan, Apr. 20, 1987, 62-97092

Int. Cl.[4] B41M *5/16*

U.S. Cl. 503—214 **11 Claims**

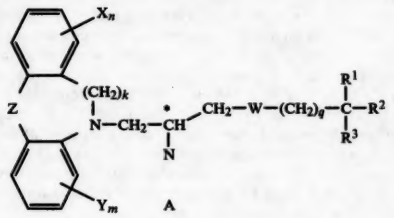
1. A pressure-sensitive microcapsule sheet comprising a support having thereon a pressure-sensitive layer comprising microcapsule containing an electron donating color former dissolved in a solvent and a binder comprising a copolymer latex comprising an ethylenically unsaturated acid amide monomer and at least one monomer selected from the group consisting of an aliphatic conjugated diolefin monomer, an aromatic vinyl monomer, and an ethylenically unsaturated nitrile monomer.

4,888,335
3-ALKOXY-2-AMINOPROPYL HETEROCYCLIC AMINES AND THEIR USE AS CARDIOVASCULAR AGENTS

Richard J. Mohrbacher, Maple Glen, and Philip P. Grous, Philadelphia, both of Pa., assignors to McNeilab, Inc., Spring House, Pa.

Filed Jul. 25, 1988, Ser. No. 223,985
Int. Cl.[4] C07D *403/06, 413/06*
U.S. Cl. 514—217 **20 Claims**

1. A propylamine of the following formula (I):



(I)

wherein

R^1, R^2 and R^3 are independently hydrogen, lower alkyl or lower alkenyl groups or $—CR^1R^2R^3$ represents a lower alkenyl group, or R^1 is a hydrogen, lower alkyl or lower alkenyl group and R^2 and R^3 are joined to form a cycloalkyl group of 3 to 8 carbons or R^1, R^2 and R^3 are joined to form a polycyclicalkyl group of 7 to 12 carbons;

W is an oxygen or a sulfur atom;

X is independently selected from the group consisting of halo, lower alkyl, lower alkoxy, trifluoromethyl, hydroxy, or, when n is 2 on adjacent carbons, methylenedioxy;

Y is independently selected from the group consisting of halo, lower alkyl, lower alkoxy, trifluoromethyl, hydroxy, or, when m is 2 on adjacent carbons, methylenedioxy;

Z is $—(CH_2)_p—$, $—CR^4=CR^5—$ or $—CHR^4—CHR^5—$

R^4 is hydrogen or lower alkyl;

R^5 is hydrogen or lower alkyl;

A represents the atoms necessary to form a pyrrolidine, piperidine or morpholine ring;

k is 0 or 1;

m is 0, 1, 2 or 3;;

n is 0, 1, 2 or 3;

p is 1, 2 or 3;

q is 0 or 1,

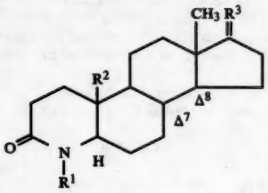
and the pharmaceutically acceptable acid addition salts thereof.

4,888,336
STEROID 5-ALPHA-REDUCTASE INHIBITORS

Dennis A. Holt, Downingtown; Mark A. Levy, St. Davids, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Jul. 28, 1987, Ser. No. 7,539
Int. Cl.[4] A61K *31/58*; C07J *73/00*
U.S. Cl. 514—278 **21 Claims**

1. A compound represented by the formula:



in which:

Δ^7, and Δ^8[, and Δ^{16}] are $—CH_2—CH_2—$ or $—CH=CH—$, provided that one of Δ^7[,] or Δ^8[, and Δ^{16}] is $—CH=CH—$[;] but Δ^7 and Δ^8 cannot be $—CH=CH—$ at the same time;

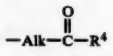
R_1 is H or $(CH_2)_{1-3}CH$,

R_2 is H or C_{1-8} alkyl;

R_3 is

(1) alpha-hydrogen, alpha hydroxyl, or alpha-acetoxy and

(a)



where Alk is absent or present as a straight or branched hydrocarbon chain of 1 to 12 carbons, and R^4 is

(i) hydrogen,

(ii) hydroxyl,

(iii) C_{1-8} alkyl,

(iv) hydroxy C_{1-8} alkyl,

(v) C_{1-8} alkoxy,

(vi) NR^5R^6, where R^5 and R^6 are each independently selected from hydrogen, C_{1-8} straight or branched chain alkyl, C_{3-6} cycloalkyl, phenyl; or R^5 and R^6 taken together with the nitrogen to which they are attached represent a 5–6 membered saturated ring having up to one other heteroatom selected from oxygen and nitrogen, or

(vii) OR^7, where R^7 is alkali metal, C_{1-18} straight or branched chain alkyl, or benzyl, or

(b) —Alk—OR^8, where Alk is always present and has the same meaning as above, and R^8 is

(i) phenyl C_{1-6} alkylcarbonyl,

(ii) C_{5-10} cycloalkylcarbonyl,

(iii) benzoyl,

(iv) C_{1-8} alkoxycarbonyl,

(v) aminocarbonyl, or C_{1-8} alkyl substituted amino, aminocarbonyl, or

(vi) hydrogen, provided that Alk is a branched C_3-C_8 chain,

(2) $=CH—Alk—CO—R^4$ or $=CH—Alk—OR^8$, where Alk is present or absent and has the same meaning as above, and R^4 and R^8 have the same meaning as above and R^8 also is hydrogen or C_{1-20} alkylcarbonyl;

(3)

where the dashed bond replaces the 17-alpha hydrogen,

(4) alpha-hydrogen and NHCOR[9] where R^9 is C_{1-12} alkyl or NR^5R^6 where R^5 and R^6 have the same meaning as above,

(5) alpha-hydrogen and cyano,

(6) alpha-hydrogen and tetrazolyl; or

(7) keto;

or a pharmaceutically acceptable salt thereof.

4,888,337

5-OXY DERIVATIVES OF TETRAHYDROFURAN

Jean-Jacques Godfroid; Francoise Heymans, both of Paris, and Pierre Braquet, Garches, all of France, assignors to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.), France

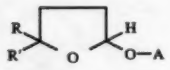
Filed Jan. 15, 1988, Ser. No. 144,238

Claims priority, application United Kingdom, Jan. 27, 1987, 8701727

Int. Cl.[4] A61K *31/395, 31/34;* C07D *405/12, 307/12*

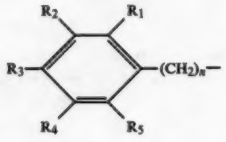
U.S. Cl. 514—326 3 Claims

1. Tetrahydrofuran derivatives having the formula I:



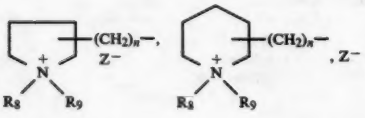
I

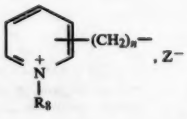
wherein either each of R and R' independently represents a hydrogen atom, a straight chain or branched chain alkyl, alkenyl or alkynyl group having from 4 to 22 carbon atoms, a cycloalkyl or cycloalkenyl group having from 5 to 10 carbon atoms, or a group of the formula:



wherein n is zero or an integer of from 1 to 5 and either each of R_1, R_2, R_3, R_4 and R_5 independently represents a hydrogen, chlorine, bromine or iodine atom, a nitro, methoxy, trifluoromethyl, trifluoromethyoxy or trifluoromethylthio group or R and R' together form a cycloalkyl group having from 5 to 10 carbon atoms and wherein A represents:

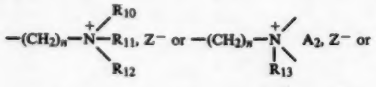
a pyrrolidinium-alkyl or piperidinium-alkyl or pyridinium-alkyl salt of the formula





in which the alkyl group $-(CH_2)_n-$ is of straight chain or branched chain configuration and has from 0 to 10 carbon atoms with each of R_8 and R_9 independently representing a hydrogen atom, a straight chain or branched chain alkyl or alkenyl group having up to 10 carbon atoms, a phenyl group or a phenylalkyl group, in which the alkyl group has from 1 to 5 carbon atoms, or

an ammonium salt of formula:



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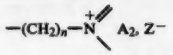
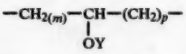
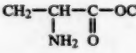


wherein $(CH_2)_n$ may be the substituted chain



wherein Y stands for ethyl or benzyle and m and p are such as both m and p≧1 with m+p+1=n, said n being an integer of from 3 to 11, Z represents a pharmaceutically acceptable anion, each of R_{10}, R_{11}, R_{12} and R_{13} independently represents a CH_3 or C_2H_5 and the ring NA_2 is either an unsubstituted or phenyl substituted monocyclic ring containing 5 to 8 ring atoms of which one is the nitrogen atom shown, one of the other atoms of the ring being selected from the group consisting of nitrogen, sulfur or carbon and, when said one other atom is not carbon, said atom being non-adjacent to said nitrogen atom shown; or a pyridinium ring; or



4,888,338

5-METHOXY ALKYL AMMONIUM TETRAHYDROFURANS AND TETRAHYDROTHIOPHENES AS ANTI-PAF AGENTS

Jean-Jacques Godfroid, Paris, and Pierre Braquet, Garches, both of France, assignors to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.), France

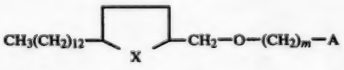
Filed May 27, 1988, Ser. No. 199,939

Claims priority, application United Kingdom, May 29, 1987, 8712694

Int. Cl.[4] C07D *405/12, 409/12;* A61K *31/44*

U.S. Cl. 514—336 2 Claims

1. A tetrahydrofuran or tetrahydrothiophene of the formula:

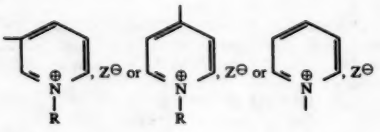


wherein

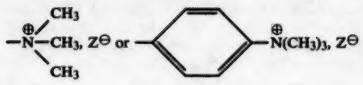
X stands for O or S,

m is an integer from 1 to 12,

A is:



wherein R stands for H or CH_3, or



$Z^{\ominus}$ is a pharmaceutically acceptable anion.

2. A therapeutic composition of matter, comprising as an essential ingredient therein, an effective amount of a compound according to claim 1 associated with an appropriate diluent or carrier.

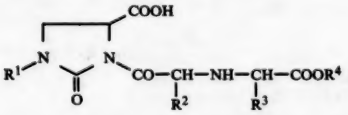
4,888,339

AGENT FOR PROPHYLAXIS AND TREATMENT OF CARDIAC HYPERTROPHY

Masami Kubo, Osaka; Takashi Ochiai, Kobe, and Hirofumi Yuasa, Amagasaki, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Dec. 9, 1987, Ser. No. 130,464
Claims priority, application Japan, Dec. 9, 1986, 61-294574
Int. Cl.[4] A61K *31/415*; C07D *233/38*
U.S. Cl. 514—392 7 Claims

1. A method for the prophylaxis and treatment of cardiac hypertrophy in a warm-blooded animal, which comprises administering to said warm-blooded animal a prophylactically or therapeutically effective amount of 2-oxo-imidazolidine compound of the formula:



(I)

wherein R^1 and R^2 are the same or different and are each a lower alkyl group, R^3 is a phenyl-substituted lower alkyl group, and R^4 is hydrogen atom or a lower alkyl group, or a pharmaceutically acceptable salt thereof.

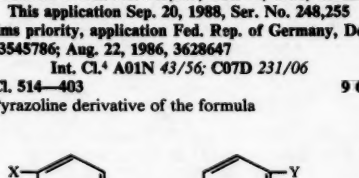
4,888,340

INSECTICIDES PYRAZOLINES, COMPOSITIONS AND USE

Harribert Neh; Ulrich Bühmann; Peter Wegner; Hartmut Joppien; David Giles, all of Berlin, Fed. Rep. of Germany, and Graham P. Rowson, Hundon, Great Britain, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 945,361, Dec. 22, 1986, abandoned. This application Sep. 20, 1988, Ser. No. 248,255
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545786; Aug. 22, 1986, 3628647
Int. Cl.[4] A01N *43/56*; C07D *231/06*
U.S. Cl. 514—403 9 Claims

1. Pyrazoline derivative of the formula



in which X is 2,2,2-trifluoroethoxy and Y is hydrogen or fluorine.

4. An insecticidal or acaricidal composition which comprises an insecticidal or acaricidal effective amount of a compound claimed in claim 1, in admixture with an agriculturally acceptable diluent or carrier.

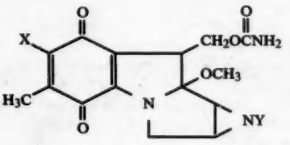
4,888,341

6-SUBSTITUTED MITOMYCIN ANALOGS

William A. Remers, and Salah M. Sami, both of Tucson, Ariz., assignors to University Patents, Inc., Westport, Conn.

Filed Sep. 4, 1984, Ser. No. 647,055
Int. Cl.[4] C07D *487/14*; A61K *31/40*
U.S. Cl. 514—410 3 Claims

2. A method for treatment of a neoplastic disease state in an animal, said method comprising administering to an animal having such a disease a therapeutically effective amount of a compound of the formula,



IV

wherein: Y is hydrogen, or lower alkyl; and X is a group of the formula —O—R, wherein R is di-lower alkoxy lower alkyl.

4,888,342

METHODS FOR TREATMENT OF SUNDAMAGED HUMAN SKIN WITH RETINOIDS

Albert M. Kligman, c/o University of Pennsylvania, Room 244, Medical Education Bldg./GM, 36th & Hamilton Walk, Philadelphia, Pa. 19104

PCT No. PCT/US87/01698, § 371 Date Mar. 8, 1988, § 102(e) Date Mar. 8, 1988, PCT Pub. No. WO88/00466, PCT Pub. Date Jan. 28, 1988
Continuation-in-part of Ser. No. 886,595, Jul. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 759,505, Jul. 26, 1985, Pat. No. 4,603,146, which is a continuation-in-part of Ser. No. 610,711, May 16, 1984, abandoned, which is a continuation-in-part of Ser. No. 297,388, Aug. 28, 1981, abandoned. This PCT application Jul. 15, 1987, Ser. No. 228,212
The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.
Int. Cl.[4] A61K *31/07, 31/40*
U.S. Cl. 514—419 4 Claims

1. A method for retarding and reversing the loss of collagen fibers, abnormal changes in elastic fibers, and deterioration of small blood vessels in sundamaged human skin, comprising applying topically to the surface of the skin a composition comprising effective amounts of a retinoid selected from the group consisting of 2-(4-Carboxybenzamido)-5,6,7,8-tetrahydro-5,5,8,8-tetramethylphaphthalene; 2-[N-(4-Carboxyphenyl)carbamoly]-5,6,7,8-tetrahydro-5,5,8,8-tetramethyllnaphthalene; 1-[3,5-(Di-tert-butyl)benzoyl]-2-(4-Carboxyphenyl)ethene; TTNT 2-(5,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2-naphthyl)-6-benzo (b) thiophene carboxylic acid; TTNF 2-(t,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2-naphthyl)-6-benzo (b) furancarboxylic acid; TTNI 2-(5,6,7,8-tetraphydro-5,5,8,8-tetramethyl-2-naphthyl)-6-indolecarboxylic acid; TTNN 2-(5,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2naphthyl)-6-naphthalene carboxylic acid; p-(5,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2-anthracenyl) benzonic acid; and esters or amides of 13 trans retinoic acid or 13-cis retinoic acid wherein the —OH group of the carboxylic acid (—COOH) group is substituted by $—OR^1$ or NR^2R^3, wherein R^1, R^2 and R^3 are such that these esters or amides can be converted to 13-trans retinoic acid or 13-cis retinoic acid through hydrolysis, metabolism, or cleavage, in a non-toxic, dermatologically acceptable vehicle in a program of maintenance therapy, whereby the skin substantially regains and maintains its firmness, turgor and elasticity during said therapy, said composition and amounts of retinoid therein

being selected so as to provide a dose for application which is insufficient to cause excessive irritation.

4,888,343

PHARMACEUTICAL COMPOSITIONS FOR RELIEF OF DYSMENORRHEA AND/OR PREMENSTRUAL SYNDROME AND PROCESS

Howard Jones, Holmdel; Alison B. Lukacsko, West Windsor; Thomas M. Tencza, Wallington; Beth A. Sarsfield, East Brunswick, and Mahesh K. Patel, Edison, all of N.J., assignors to Bristol-Myers Company, New York, N.Y.

Filed Sep. 15, 1986, Ser. No. 907,698

Int. Cl.[4] A61K *31/19, 31/52, 31/54, 31/185*

U.S. Cl. 514—264 **14 Claims**

1. A pharmaceutical composition for the relief of dysmenorrhea and/or premenstrual syndrome consisting essentially of as the only pharmaceutically active ingredients (a) ibuprofen and (b) pamabrom, said pharmaceutically active ingredients (a) and (b) being present in the composition in amounts effective to afford relief from the symptoms of dysmenorrhea and/or premenstrual syndrome.

4,888,344

CARBAPENEM COMPOUND IN CRYSTALLINE FORM, AND ITS PRODUCTION AND USE

Makoto Sunagawa, Itami; Yutaka Isobe, Nishinomiya; Yutaka Takeuchi, Toyonaka; Haruki Matsumura, Nara; Yukio Ozaki, Takatsuki, and Tetsuo Noguchi, Suita, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited, Osaka, Japan

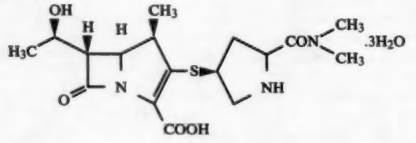
Filed Jul. 30, 1987, Ser. No. 79,470

Claims priority, application Japan, Jul. 30, 1986, 61-179321; Jun. 26, 1987, 62-157769

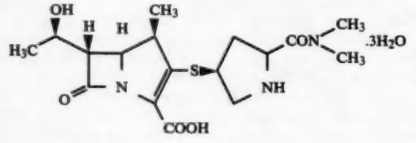
Int. Cl.[4] C07D *487/04;* **A61K** *31/40*

U.S. Cl. 514—210 **4 Claims**

1. Crystalline (4R, 5S, 6S, 8R, 2'S, 4'S)-3-[4-(2-Dimethylaminocarbonyl)pyrrolidinylthio]-4-methyl-6-(1-hydroxyethyl)- 1-azabicyclo [3.2.0]hept-2-en-7-one-2-carboxylic acid trihydrate of the formula:



2. A pharmaceutical composition for being dissolved in a physiologically acceptable aqueous medium and injected into a human body, which comprises as an active ingredient crystalline (4R, 5S, 6S, 8R, 2'S, 4'S)-3-[4-2-dimethylaminocarbonyl)-pyrrolidinylthio]-4-methyl-6-(1-hydroxyethyl)-1-azabicyclo[3.2.0]hept-2-en-7-one-2-carboxylic acid trihydrate of the formula:



and a non-toxic carbonate.

4,888,345

4,8-DISUBSTITUTED-1,2-DIHYDRO AND 1,2,3,4-TETRAHYDROIMIDAZO-[1,5-A] PYRIMIDINES

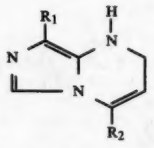
Shin S. Tseng, Bridgewater, N.J.; John P. Dusza, Nanuet, and Joseph W. Epstein, Monroe, both of N.Y., assignors to American Cyanamid Company, Wayne, N.J.

Filed Feb. 24, 1988, Ser. No. 159,977

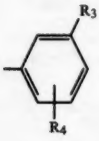
Int. Cl.[4] C07D *487/02;* **A61K** *31/53*

U.S. Cl. 514—258 **16 Claims**

1. A 4,8-disubstituted-1,2-dihydroimidazo (1,5-a)-pyrimidine of the formula:



wherein R_1 is cyano or carbamoyl and R_2 is, a moiety of the formula:



wherein R_3 and R_4 are each individually selected from the group consisting of hydrogen, halogen, alkyl(C_1–C_3), alkoxy(C_1–C_3), nitro and trifluoromethyl.

4,888,346

METHOD FOR THE TREATMENT OF PERSONS INFECTED WITH HTLV-III (AIDS) VIRUS

Bernard Bihari, 29 W. 15th St., and Finvola Drury, 147 W. 22nd St., both of, New York, N.Y. 10011

Continuation of Ser. No. 916,180, Oct. 7, 1986. This application Dec. 4, 1987, Ser. No. 129,862

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—282 **7 Claims**

1. A method of treating humans infected with HTLV-III (AIDS) virus, which comprises the steps of administering by a pharmacologically effective mode to such patient an effective dosage within a range corresponding to about 1.0 to about 5.0 mg for naltrexone, of an essentially pure opiate receptor antagonist which within said dosage range exerts an opiate receptor blocking action substantially exclusively towards Mu opiate receptors.

4,888,347

USE OF SPECIFIC N-METHYL-D-ASPARTATE RECEPTOR ANTAGONISTS IN THE PREVENTION AND TREATMENT OF NEURODEGENERATION

Geoffrey N. Woodruff, Braughing; Erik H. F. Wong, and John A. Kemp, both of Hertford, all of England, assignors to Merck Sharp & Dohme Limited, Hoddesdon, England

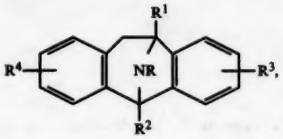
Filed Dec. 24, 1986, Ser. No. 946,262

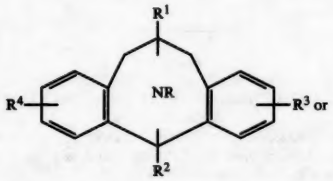
Claims priority, application United Kingdom, Jan. 14, 1986, 8600783

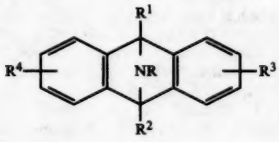
Int. Cl.[4] A61K *31/44, 31/40*

U.S. Cl. 514—289 **8 Claims**

1. A method of producing a neuroprotective effect by selectively antagonizing N-methyl-D-aspartate receptors which comprises the administration to a patient in need of such treatment, of an effective amount of a compound of structural formula:







or a pharmaceutically acceptable salt thereof, wherein R is

(1) hydrogen,
(2) C_{1-5}alkyl,
(3) C_{2-5}alkenyl,
(4) (optionally substituted phenyl)-(C_{1-3}alkyl),
(5) C_{3-6}cycloalkyl,
(6) (C_{3-6}cycloalkyl)-(C_{1-3}alkyl), or
(7) di(C_{1-5}alkyl)amino-(C_{1-3}alkyl);

R^1 is

(1) hydrogen,
(2) C_{1-5}alkyl,
(3) C_{2-5}alkenyl,
(4) phenyl-(C_{1-3}alkyl),
(5) C_{3-6}cycloalkyl, or
(6) (C_{3-6}cycloalkyl)-(C_{1-3}alkyl);

R^2 is

(1) C_{1-5}alkyl,
(2) C_{1-5}alkenyl,
(3) phenyl-(C_{1-3}alkyl),
(4) (C_{3-6}cycloalkyl)-C_{1-3}alkyl),
(5) di(C_{1-5}alkyl)amino-C_{1-5}alkyl), or
(6) (C_{2-3}hydroxyalkyl); and

R^3 and R^4 are independently,

(1) hydrogen
(2) halogen,
(3) C_{1-5}alkoxy,
(4) trifluoromethylthio,
(5) cyano,
(6) carboxy, or
(7) hydroxy.

4,888,348

SUBSTITUTED THIOUREAS, ISOTHIOUREAS AND CARBODIIMIDES

Josef Ehrenfreund, Allschwil, Switzerland; Manfred Böger, Weil am Rhein, Fed. Rep. of Germany; Odd Kristiansen, Möhlin, Switzerland; Jozef Drabek, Oberwil, Switzerland, and Haukur Kristinsson, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

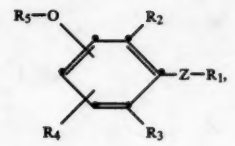
Filed Aug. 28, 1987, Ser. No. 91,157

Claims priority, application Switzerland, Sep. 4, 1986, 3561/86

Int. Cl.[4] C07D *777/34, 277/68;* **A01N** *47/30, 43/78*

U.S. Cl. 514—367 **22 Claims**

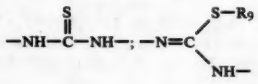
1. A compound of formula I



(I)

wherein

Z is



or —N=C=N—;

R_1 is C_1–C_{12}alkyl, C_3–C_{10}alkenyl, C_3–C_{10}alkynyl, C_3–C_8cycloalkyl, C_1–C_3alkyl substituted by 1 or 2 C_3–C_6cycloalkyl radicals, or is alkoxyalkyl containing a total of 3 to 10 carbon atoms, halogen-substituted C_1–C_{12}alkyl, polycyclic C_7–C_{10}cycloalkyl, or phenyl(C_1–C_5)alkyl which may be substituted in the phenyl moiety by 1 or 2 identical or different members selected from the group consisting of halogen, methoxy, ethoxy and C_1–C_5alkyl,

R_2 is hydrogen or C_1–C_5alkyl,

R_3 is C_1–C_5alkyl or C_3–C_6cycloalkyl,

R_4 is hydrogen or C_1–C_4alkyl,

R_5 is a thiazole or benzthiazole radical which radical may be substituted at the carbon or nitrogen atoms by 1 to 3 of the substituents R_6, R_7 and R_8,

R_6 and R_7 are each independently of the other hydrogen, halogen, C_1–C_4alkyl, halogen-substituted C_1–C_4alkyl, C_1–C_4alkoxy, halogen-substituted C_1–C_4alkoxy, phenyl, or C_1–C_4-alkylthio,

R_8 is hydrogen or C_1–C_4alkyl, and

R_9 is C_1–C_5alkyl, C_2–C_5alkenyl, C_3–C_4alkynyl, alkoxyalkyl containing a total of 10 carbon atoms, or alkylthioalkyl containing a total of 10 carbon atoms or a salt thereof with an acid or a base.

4,888,349

MIXTURE OF FUNGICIDAL AGENTS

Wilhelm Brandes, Leichlingen; Helmut Kaspers, Leverkusen; Paul Reinecke, Leverkusen; Hans Scheinpflug, Leverkusen, and Wolfgang Krämer, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

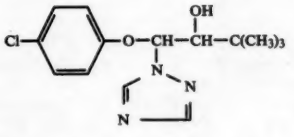
Continuation of Ser. No. 649,463, Sep. 11, 1984, abandoned, which is a division of Ser. No. 468,729, Feb. 22, 1983, Pat. No. 4,514,402. This application Mar. 6, 1987, Ser. No. 22,454

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1982, 3208142

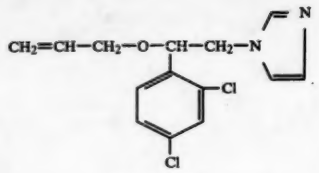
Int. Cl.[4] A61K *31/41, 31/415*

U.S. Cl. 514—383 **5 Claims**

1. A fungicidal composition comprising a fungicidally effective amount of a mixture of I



and II, 0.05 times the weight of I, of



4,888,350

NEW ACYL-1H-1,2,4-TRIAZOLE DERIVATIVES

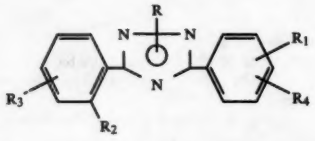
Amedeo Omodei-Sale', Voghera; Pietro Consonni, Milan, and Giulio Galliani, Monza, all of Italy, assignors to Gruppo Lepetit S.p.A., Italy

Continuation of Ser. No. 594,891, Apr. 20, 1989, abandoned, which is a continuation of Ser. No. 87,375, Oct. 23, 1989, Pat. No. 4,459,302. This application Oct. 3, 1986, Ser. No. 915,119

Int. Cl.[4] A61K *31/075, 31/10*

U.S. Cl. 514—384 1 Claim

1. A method for preventing reproduction in warm-blooded animals, which comprises administering to the animal a dosage from about 0.1 to about 25 mg/kg of body weight of a compound of formula



wherein

R is located on one of the two adjacent nitrogen atoms and represents a member of the group consisting of

(a) hydrogen;

(b) a group R_5 —CO wherein R_5 is selected from (C_{1-4})alkyl, (C_{2-4})alkenyl, (C_{2-4})alkynyl, phenyl, phenyl substituted by one to three groups independently selected from halo, (C_{1-4})alkyl, (C_{1-4})alkoxy, trifluoromethyl, cyano, nitro, amino, di-(C_{1-4})alkylamino, (C_{2-4})alkanoylamino and methylenedioxy, cinnamyl, benzyl, (C_{1-4})alkylamino, phenylamino, phenylamino wherein the phenyl ring may be substituted by one to three groups independently selected from halo, (C_{1-4})alkyl, (C_{1-4})alkoxy, trifluoromethyl, cyano, nitro, amino, di(C_{1-4})alkylamino, (C_{2-4})alkanoylamino and methylenedioxy, halo (C_{1-4})alkyl, and benzyloxy; and

(c) a group R_6 —SO_2 wherein R_6 represents (C_{1-4})alkyl, phenyl, phenyl substituted by a radical selected from (C_{1-4})alkyl and (C_{1-4})alkoxy, or phenacyl;

R_1 is selected from hydrogen, (C_{1-4})alkyl, (C_{1-4})alkoxy, allyloxy, propargyloxy, trifluoromethyl, phenyl, halo and dimethylamino;

R_2 represents the group

wherein R_7 is hydrogen or methyl and R_8 is the group R_5 —CO or the group R_6 —SO_2 in which R_5 and R_6 are defined as above;

R_3 and R_4 are independently selected from the group consisting of hydrogen, halogen, (C_{1-4})alkyl, and (C_{1-4})alkoxy;

R_1 and R_4 taken together also represent a methylenedioxy group; with the proviso that when R represents hydrogen, R_2 must be the group

in which R_8 must be the group R_6 —SO_2 wherein R_6 is as above defined; or a salt thereof with a pharmaceutically acceptable acid.

4,888,351

3-PHENOXY (OR PHENYLTHIA) CYCLOPENTANECARBONYLAMINO ACID ANALOGUES

Katsuhiro Imaki, Kyoto; Tadao Okegawa, Yawata, and Yoshinobu Arai, Osaka, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

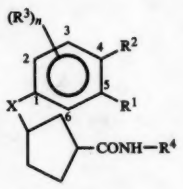
Division of Ser. No. 158,457, Feb. 22, 1988, Pat. No. 4,829,078, which is a division of Ser. No. 942,109, Dec. 16, 1986, Pat. No. 4,783,476. This application Nov. 7, 1988, Ser. No. 268,623

Claims priority, application Japan, Dec. 16, 1985, 60-281203

Int. Cl.[4] A61K *31/38, 31/34;* C07D *333/36, 333/22*

U.S. Cl. 514—397 5 Claims

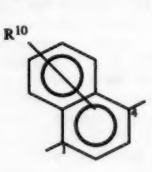
1. A derivative of 3-phenoxy or phenylthio cyclopentanecarbonylamino acid of the general formula:



(I)

R^1 represents a hydrogen atom and R^2 represents the group of the general formula: —COR^7 wherein R^7 represents the group of the general formula:

wherein Y represents a single-bond, an alkylene group or an alkenylene group of 1 to 4 carbon atoms, W represents an oxygen atom or a sulfur atom, m represents an integer of 1 to 3, R^8 represents a hydrogen atom, a halogen atom, a nitro group, a hydroxy group or an alkyl group or an alkoxy group of 1 to 4 carbon atoms, with the proviso that when m represents an integer of two or more, plural R^8s may be different each, R^3 represents a hydrogen atom, a halogen atom, an alkyl group of 1 to 4 carbon atoms or two of R^3 and a phenyl group to which two of R^3 are linked, together represent a naphthyl group of the general formula:



wherein R^{10} represents a hydrogen atom, a halogen atom or an alkyl group of 1 to 4 carbon atoms, with the proviso that when R^1 represents a hydrogen atom, the hydrogen atom may be

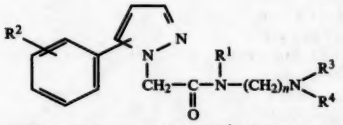
replaced by R^3, and n represents an integer of 1 to 3, with the proviso that when n represents an integer of two or more, plural R^3s may be different, X represents an oxygen atom or a sulfur atom and R^4 represents an amino acid-residue selected from the group consisting of alanine, β-alanine, asparagine, 4-aminobutryic acid, glycine, glutamine, serine, phenylalanine, cysteine, 4-amino-3-hydroxybutryic acid, tryptophane, leucine, isoleucine, threonine, methionine, proline, valine, glutamic acid, asparaginic acid, lysine, arginine and histidine, or a non-toxic salt thereof.

4,888,352
3,4, OR 5-ARYL-1H-PYRAZOLE-1-ALKANAMIDES AS ANTIARRHYTHMIC AGENTS, COMPOSITIONS AND USE

Denis M. Bailey, East Greenbush, and Virendra Kumar, Colonie, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 22, 1989, Ser. No. 327,212
Int. Cl.[4] A61K *31/415*; C07D *231/12*
U.S. Cl. 514—406 **11 Claims**

1. A compound of formula:



or acid-addition salt thereof wherein R^1 is hydrogen or lower-alkyl; R^2 is hydrogen, hydroxy, lower-alkyl, lower-alkoxy, lower-alkylamino, lower-alkylamido, lower-alkylsufonamido, nitro, amino, cyano, or halo; R^3 and R^4 are independently hydrogen lower-alkyl or hydroxy lower-alkyl, or R^4 and R^3 together form a straight or branched alkylene chain of four to six carbons; and n is an integer from two to eight.

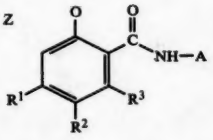
6. A composition for treating cardiac arrhythmias comprising an amount of a compound according to claim 1 effective to treat cardiac arrhythmias together with one or more pharmaceutically acceptable excipients or diluents.

4,888,353
CARBOXAMIDES USEFUL AS ANTIEMETIC OR ANTIPSYCHOTIC AGENTS

Daniel Lednicer, Columbia, Mo., and Jung-Hui Sun, Dublin, Ohio, assignors to Erbamont, Inc., Minn.

Continuation of Ser. No. 835,006, Feb. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 564,641, Dec. 22, 1983, abandoned. This application May 23, 1986, Ser. No. 868,899
Int. Cl.[4] A61K *31/40*; C07D *498/02*
U.S. Cl. 514—422 **37 Claims**

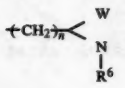
1. A compound of the formula (I):



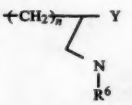
wherein Z represents the carbon atoms necessary to complete a 5- to 7-membered ring,

R^1, R^2, and R^3 may be the same or different and one of R^1, R^2 and R^3 is a hydrogen atom and the others are selected from the group consisting of a hydrogen atom, a lower alkyl group, a cycloalkyl group, a halogen atom, an amino group, a lower alkylamino group or dialkylamino group, an alkoxy group, an acylamido group, a sulfonamido group, and a nitro group;

A represents an aminoalkyl moiety selected from the group consisting of:



(IV)



(V)

wherein W represents the carbon and hydrogen atoms necessary to complete a 5 membered ring, Y represents the carbon and hydrogen atoms necessary to complete a 5 membered ring, R^6 is selected from the group consisting of a hydrogen atom, a lower alkyl group, a phenyl group, a phenalkyl group, a fluorine substituted lower alkyl group, an allyl group, and a propargyl and n is 0 or an integer of 1 to 3; and

acid addition salts thereof.

4,888,354
SKIN PENETRATION ENHANCEMENT USING FREE BASE AND ACID ADDITION SALT COMBINATIONS OF ACTIVE AGENTS

Yunik Chang, Lakewood, N.J., and Dinesh C. Patel, Murray, Utah, assignors to Theratech, Inc., Salt Lake City, Utah

Filed Dec. 21, 1987, Ser. No. 136,115
Int. Cl.[4] A01N *43/36*
U.S. Cl. 514—424 **22 Claims**

1. A penetration-enhancing pharmaceutical composition for topical application containing an active permeant which exists in both free base and acid addition salt forms comprising:

(a) about 0.001 to 50% by weight of said permeant which is present as a mixture consisting of both free base and acid addition salt forms wherein the weight ratio of free base to acid addition salt in said mixture is between about 1:20 and 20:1 and wherein said acid addition salt is formed by reacting the free base with an acid selected from the group consisting of hydrochloric, hydrobromic, hydroiodic, phosphoric, sulfuric, nitric, sulfamic, citric, lactic, maleic, pyruvic, oxalic, succinic, tartaric, cinnamic, acetic, trifluoroacetic, benzoic, salicylic, gluconic, ascorbic and related pharmaceutically acceptable acids; and

(b) 50 to 99.999% by weight of a pharmaceutically acceptable carrier.

20. A method for enhancing the rate of penetration of an active pharmaceutical permeant, capable of existing in both free base and acid addition salt forms, across the skin or mucous membrane barrier of a subject which comprises topically applying to the skin or mucous membranes of said subject a safe and effective amount of a composition comprising:

(a) about 0.001 to 50% by weight of said permeant which is present as a mixture consisting of both free base and acid addition salt forms wherein the weight ratio of free base to acid addition salt in said mixture is between about 1:20 and 20:1 and wherein said acid addition salt is formed by reacting the free base with an acid selected from the group consisting of hydrochloric, hydrobromic, hydroiodic, phosphoric, sulfuric, nitric, sulfamic, citric, lactic, maleic, pyruvic, oxalic, succinic, tartaric, cinnamic, acetic, trifluoroacetic, benzoic, salicylic, gluconic, ascorbic and related pharmaceutically acceptable acids; and

(b) 50 to 99.999% by weight of a pharmaceutically acceptable carrier.

4,888,355

INDANES AND THEIR USE AS ANTIARRHYTHMIC AGENTS

Francois Clemence; Odile Le Martret; Michel Fortin, all of Paris, and Francoise Delevalleé, Fontenay-Sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

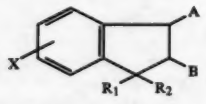
Filed Dec. 22, 1987, Ser. No. 136,814

Claims priority, application France, Dec. 23, 1986, 86 18026

Int. Cl.[4] A61K *31/40, 31/16;* C07C *103/75;* C07D *207/09*

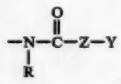
U.S. Cl. 514—429 15 Claims

1. A compound selected from the group consisting of all enantiomeric and diastereoisomeric forms possible of compounds of the formula



I

wherein X is selected from the group consisting of hydrogen, halogen and alkyl and alkoxy of 1 to 5 carbon atoms, R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms, one of A and B being



and the other being

R is hydrogen or alkyl of 1 to 5 carbon atoms, Z is $-(CH_2)_n-$ or branched alkylene of 2 to 8 carbon atoms, n is an integer from 0 to 5, Y is naphthyl unsubstituted or substituted with at least one member of the group consisting of alkyl and alkoxy of 1 to 5 carbon atoms, halogen, —OH, $-CF_3$, $-NO_2$, monoalkylamino and dialkylamino of 1 to 4 alkyl carbon atoms and phenyl unsubstituted or substituted with at least one member of the group consisting of halogen and alkyl and alkoxy of 1 to 4 carbon atoms, R_3 and R_4 are individually hydrogen or alkyl of 1 to 5 carbon atoms or taken together with the nitrogen form a heterocyclic of 5 to 6 ring members selected from the group consisting of pyrrolidinyl, piperazinyl, morpholinyl and piperidinyl and their non-toxic, pharmaceutically acceptable acid addition salts.

4,888,356

USE OF SUBSTITUTED DIHYDROBENZOPYRANS FOR ALLERGY AND INFLAMMATION

Masatoru Miyano, Northbrook; Robert L. Shone, Palatine, both of Ill., and Daniel D. Sohn, Uppsala, Sweden, assignors to G. D. Searle and Company, Chicago, Ill.

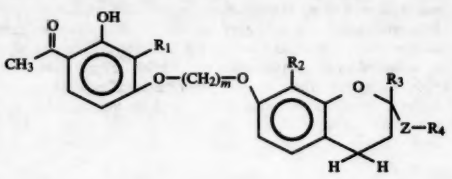
Continuation of Ser. No. 681,038, Dec. 12, 1984, Pat. No. 4,778,903, which is a division of Ser. No. 560,355, Dec. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 520,973, Aug. 8, 1983, abandoned. This application Jun. 14, 1988, Ser. No. 206,624

The portion of the term of this patent subsequent to Oct. 18, 2005, has been disclaimed.

Int. Cl.[4] A61K *31/35, 31/40, 31/445*

U.S. Cl. 514—456 24 Claims

1. A pharmaceutical composition for the treatment of allergic reactions or inflammatory conditions associated with leukotriene D_4 comprising a compound of the formula



wherein Z is:

(a) $-(CH_2)_n-$; or

(b) $-(CH_2)_p-CH=CH-(CH_2)_q-$;

wherein m is an integer of from 2 to 6 inclusive;

wherein n is an integer of from 1 to 3 inclusive;

wherein p is an integer of from zero to 4 inclusive;

wherein q is an integer of from zero to 4 inclusive;

wherein p+q is equal to or less than 6;

wherein R_1, R_2 and R_6 are:

(a) alkyl of 1 to 6 carbon atoms, inclusive, each being the same or different;

wherein R_3 is

(a) hydrogen; or

(b) alkyl of 1 to 6 carbon atoms, inclusive;

wherein R_4 is:

(a) $-CO_2H$;

(b) $-CO_2R_6$;

(c) $-CONR_7R_8$; and

wherein R_7 and R_8 are:

(a) hydrogen;

(b) alkyl of 1 to 6 carbon atoms, inclusive R_7 and R_8 each being the same or different; or

(c) taken together with the nitrogen atom to which they are attached form a 5 or 6 member saturated N-heterocycle optionally substituted by carboxylic acid or methyl ester thereof with the balance of the members being carbon;

or the pharmacologically acceptable addition salts thereof; and a pharmaceutically acceptable carrier.

4,888,357

ANTIARTHRITIC β-CYCLOALKYL-β-OXOPROPIONITRILES

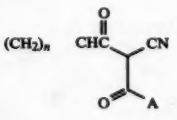
William T. Han, Cheshire, Conn., assignor to Bristol-Myers Company, New York, N.Y.

Filed Jan. 26, 1988, Ser. No. 148,540

Int. Cl.[4] A61K *31/275;* C07C *121/46*

U.S. Cl. 514—519 19 Claims

1. A compound having the formula



wherein

n=2, 3, 4, or 5;

A is C_{1-5}alkyl, NHR^1, or NR^2R_3; wherein R^1 is selected from the group consisting of C_{1-5}alkyl, C_{2-5}alkenyl, C_{2-5}alkynyl, and C_{3-6}cycloalkyl with the proviso that when n is 2, R^1 is not ethyl or isopropyl; and R^2 and R^3 are the same or different C_{1-5}alkyl;

or a pharmaceutically acceptable salt thereof.

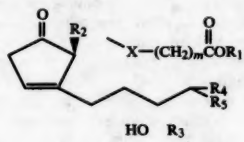
4,888,358

13,14-DIHYDROPROSTAGLANDIN C-TYPE DERIVATIVES

Joan Huguet, Ciudad Satelite, Mexico; Joseph M. Muchowski, Sunnyvale, Calif., and Maria T. Lara, Toluca, Mexico, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Aug. 25, 1988, Ser. No. 236,697
Int. Cl.[4] C07C *177/00*; A61K *31/557*
U.S. Cl. 514—530 28 Claims

1. A compound of the formula:



(I)

wherein:

m is 1 or 3;

R_1 is hydrogen or alkyl of 1–6 carbon atoms;

R_2 is hydrogen or lower alkyl of 1–4 carbon atoms;

R_3 and R_4 are independently hydrogen or methyl;

R_5 is alkyl of 4–10 carbon atoms, $CF_3(CH_2)_n$— in which n is an integer of 3–5, cycloalkyl of 4–8 carbon atoms, or phenyl, benzyl or phenoxy in which any phenyl group may be optionally substituted with one or two substitutents chosen from lower alkyl of 1–4 carbon atoms, lower alkoxy of 1–4 carbon atoms, lower thioalkyl of 1–4 carbon atoms, halogen, trifluoromethyl and trifluoromethoxy; or

R_4 and R_5 taken together with the carbon to which they are attached represent cycloalkyl of 4–8 carbon atoms;

X is cis —CH=CH— or —CH_2CH_2— when m is 3, or

X is —CH_2CH=C=CH— when m is 1;

and the wavy lines represent the α or β configuration with the proviso that when one wavy line is α the other is β; or a pharmaceutically acceptable, non-toxic salt thereof.

4,888,359

ANALGESIC AND ANTIINFLAMMATORY PHARMACEUTICAL COMPOSITION CONTAINING A NAPHTHYL-ACETIC ACID DERIVATIVE

Simos Contos, Milan, Italy, assignor to Istituto Biochimico Sperimentale Ibis S.P.A., Florence, Italy

Division of Ser. No. 182,932, Apr. 18, 1988, abandoned. This application May 12, 1989, Ser. No. 352,631
Claims priority, application Italy, Apr. 23, 1987, 20227 A/87
Int. Cl.[4] A61K *31/19*
U.S. Cl. 514—569 1 Claim

1. A method for treating a patient suffering from pain and inflammation which comprises administering to such patient a composition comprising as the principal active ingredient a therapeutically effective amount of α-methyl-α-(3,4-dihydro-1-naphthyl)acetic acid in admixture with a pharmaceutically acceptable carrier.

4,888,360

CARVONE ENHANCEMENT OF TRANSDERMAL DRUG DELIVERY

Thomas W. Leonard; Karol K. Mikula, both of Clinton, N.Y., and Marcia S. Schlesinger, Middlesex, N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Jan. 16, 1987, Ser. No. 3,976
Int. Cl.[4] A61K *31/12*, *47/00*
U.S. Cl. 514—675 11 Claims

1. A composition for the transdermal delivery of physiologically active agents to mammals by topical administration comprising an effective amount of a systemically active, water soluble or solubilizable drug, a percutaneous transfer enhancing amount of 1-carvone and a pharmaceutically acceptable vehicle comprising at least one pharmaceutically acceptable solvent or solubilizer for said 1-carvone, said enhancing amount of 1-carvone comprising by weight about 5% to about 16% of the composition.

4,888,361

PROCESS FOR THE PRODUCTION OF METHANOL AND CATALYST COMPOSITION FOR SAID PROCESS

Swan T. Sie; Eit Drent, and Willem W. Jager, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 17, 1989, Ser. No. 231,924
Claims priority, application European Pat. Off., Sep. 4, 1987, 87201680.3
Int. Cl.[4] C07C *27/06*
U.S. Cl. 518—700 17 Claims

1. A process for the production of methanol comprising contacting a gaseous mixture of carbon monoxide and hydrogen with a catalytic system in the liquid phase, obtainable by the reaction of:

component (a): a salt containing a cation of an element of Group VIII of the Periodic Table of Elements,

component (b): an alcohol, and

component (c): an alcoholate derived from an alkali metal or from an alkaline earth metal, and

wherein said catalytic system is activated before use by heating at least components (a) and (b) to a temperature of from about 20°–60° C. under a nitrogen atmosphere for 0.3 to 1 hour.

4,888,362

EUGENOL ENHANCEMENT OF TRANSDERMAL DRUG DELIVERY

Thomas W. Leonard; Karol K. Mikula, both of Clinton, N.Y., and Marcia S. Schlesinger, Middlesex, N.J., assignors to American Home Products Corp., New York, N.Y.

Filed Jan. 16, 1987, Ser. No. 3,983
Int. Cl.[4] A61K *31/045*
U.S. Cl. 514—724 11 Claims

1. A composition for the transdermal delivery of physiologically active agents to mammals by topical administration comprising an effective amount of a systemically active, water soluble or solubilizing drug, a percutaneous transfer enhancing amount of eugenol and a pharmaceutically acceptable vehicle comprising at least one pharmaceutically acceptable solvent or solubilizer for said eugenol, said enhancing amount of eugenol comprising by weight about 5% to about 16% of the composition.

4,888,363

ANHYDROUS COSMETIC PREPARATION

Michael P. Dulak, Middletown, N.Y., and Julius R. Zecchino, Kinnelon, N.J., assignors to Avon Products, Inc., New York, N.Y.

Filed Jul. 29, 1987, Ser. No. 79,060
Claims priority, application Japan, Jul. 29, 1986, 61-178584
Int. Cl.[4] C10M *101/00*, *113/00*
U.S. Cl. 514—725 13 Claims

1. A cosmetic or therapeutic composition comprising:

an emollient, said emollient being present in an amount in the range of about 20% to about 45% by weight;

a thickening agent, said thickening agent being present in an amount in the range of about 0.5% to about 40% by weight;

a solublizing agent for rendering the thickening agent miscible in said emollient, said solublizing agent being present in an amount in the range of about 10% to about 90%, said solublizing agent, said thickening agent and said emollient forming an anhydrous carrier, and

a working ingredient dispersed throughout said anhydrous carrier, said working ingredient being present in an amount in the range of about 0.002% to about 2% by weight, said working ingredient comprising Vitamin A or its derivatives, said anhydrous carrier being percutane-

ously absorbable by human skin and said working ingredient being rendered stable in carrier.

4,888,364

SOLID GEL DISPENSERS FOR ACHIEVING CONTROLLED RELEASE OF VOLATILE LIQUID MATERIALS AND METHOD FOR PREPARING SAME

Daniel Graiver, Midland, and Robert E. Kalinowski, Auburn, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 309,280, Jan. 26, 1989. This application Apr. 13, 1989, Ser. No. 337,671
Int. Cl.[4] C08J *9/28*
U.S. Cl. 521—64 3 Claims

1. A method for preparing a free standing polyvinyl alcohol hydrogel dispenser for the controlled release of a volatile liquid material selected from the group consisting of fragrances, disenfectants, biologically active materials, perfumes, deodorizers and physiologically and biologically active materials, said method consisting essentially of the following steps:

(1) heating under atmospheric pressure a mixture comprising from 5 to 25 weight percent of polyvinyl alcohol, a polyelectrolyte which is capable of being ionized and dissociated on contact with water, but is insoluble in the liquid polyvinyl alcohol compositions used to prepared the present hydrogels, water, and at least one water-miscible liquid selected from the group consisting of monohydric alcohols and dimethyl sulfoxide, the concentration of water-miscible liquid being sufficient to maintain said polyelectrolyte as a dispersed phase in a solution of said polyvinyl alcohol,

(2) placing said dispersion in a container corresponding in contour to the shape of the final dispenser and cooling the resultant dispersion to below room temperature to form a hydrogel in the shape of the final dispenser,

(3) when said water-miscible liquid is dimethyl sulfoxide, placing said hydrogel in contact with methanol or ethanol for a period of time sufficient to replace substantially all of the dimethyl sulfoxide with said methanol or ethanol,

(4) placing said dispenser in an aqueous solution of said volatile liquid for a period of time sufficient to absorb an amount of said solution equivalent to at least 95 weight percent of the final dispenser, replace at least a portion of the water present in said dispenser with said solution, and

(5) removing the final dispenser from said aqueous solution.

4,888,365

ISOCYANATE TERMINATED QUASI-PREPOLYMERS USEFUL FOR PREPARING POLYURETHANE/POLYISOCYANURATE FOAMS HAVING LOW THERMAL CONDUCTIVITY

Robert E. Riley, Flat Rock, and Thirumurti Naravan, Grosse Ile, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Continuation of Ser. No. 13,653, Feb. 12, 1987, Pat. No. 4,791,148. This application Sep. 16, 1988, Ser. No. 245,089
Int. Cl.[4] C08G *18/30*
U.S. Cl. 521—157 5 Claims

1. A polyurethane foam prepared by reacting

(a) an isocyanate terminated quasi-prepolymer consisting of the reaction product of an organic polyisocyanate with a polyester polyol consisting of the reaction product of phthalic anhydride and a low molecular weight aliphatic polyhydric alcohol; with

(b) a polyol selected from the group consisting of polyether polyols, hydroxyl-functional polyester polyols, and hydroxyl-functional polyesterether polyols;

in the presence of a urethane group promoting catalyst, a blowing agent, and suitable additives and auxiliaries.

4,888,366

INDUCTIVE COLLAGEN-BASED BONE REPAIR PREPARATIONS

George Chu, Sunnyvale; Ranga Nathan, Newark, and Saeid Seyedin, Mountain View, all of Calif., assignors to Collagen Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 816,268, Jan. 6, 1986, which is a continuation-in-part of Ser. No. 664,158, Oct. 24, 1984, Pat. No. 4,563,350. This application Sep. 25, 1987, Ser. No. 100,990
Int. Cl.[4] A61F *2/02, 5/04*
U.S. Cl. 523—115 20 Claims

1. A process for preparing a hypoimmunogenic composition suitable for implantation to effect bone repair in a vertebrate wherein the composition comprises an osteoinductively effective amount of a protein osteoinductive factor (OF), which OF is sufficiently pure to be hypoimmunogenic in a xenogeneic host, and a carrier having components which consist essentially of mineral constituting 60–98% and collagen constituting 2–40% of the composition, which process comprises:

(a) preparing a uniform suspension in water of the collagen, mineral, and OF components of the composition so that the concentration of collagen in the suspension is 30–100 mg/ml; and

(b) subjecting the suspension to controlled drying under ambient pressure to obtain a rigid solid.

4,888,367

PROCESS FOR NEUTRALIZING CROSSLINKED POLY (ACRYLIC ACID)

Vincent P. Quigley, and Richard J. Jorkasky, II, both of Maple Heights, Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 1, 1987, Ser. No. 126,652
Int. Cl.[4] C08L *0/00*
U.S. Cl. 524—17 19 Claims

1. A process for neutralizing a polymer of an olefinically unsaturated carboxylic acid containing at least one activated carbon-to-carbon double bond and at least one carboxyl group, in order to form the neutralized salt of said polymer which is useful as a thickening agent for aqueous solutions, wherein the process comprises combining with mixing:

(i) the neutralized salt of a polymer of an olefinically unsaturated carboxylic acid containing at least one activated carbon-to-carbon double bond and at least one carboxyl group, said neutralized salt suspended in a blend of organic solvent and aqueous solvent;

(ii) a neutralizing agent selected from the group consisting of organic bases and inorganic bases; and

(iii) a slurry comprising an unneutralized polymer of an olefinically unsaturated carboxylic acid containing at least one activated carbon-to-carbon double bond and at least one carboxyl group, and at least one organic solvent.

4,888,368

METHOD OF INHIBITING THE DISCOLORATION OF EMULSIONS AND DISCOLORATION RESISTANT EMULSION COMPOSITIONS

Gretchen S. Kohl, Midland, and James McGee, Sanford, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 12, 1988, Ser. No. 193,465
Int. Cl.[4] C08K *5/34*
U.S. Cl. 524—92 11 Claims

1. A method of inhibiting discoloration of silicone aqueous emulsions due to contact with ferrous materials comprising the addition to the emulsion of from 0.1 to 1.6 wt.%, based on the oil phase of the emulsion, of one or more members selected from the group consisting of phosphoric acid and disodium phosphate.

4,888,369

POLYPROPYLENE COMPOSITION RESISTANT TO HIGH ENERGY RADIATION, AND RADIATION STERILIZED ARTICLES THEREFROM

Edward P. Moore, Jr., Wilmington, Del., assignor to Himont Incorporated, Wilmington, Del.

Continuation of Ser. No. 5,651, Jan. 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 834,227, Feb. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 582,354, Feb. 22, 1984, abandoned, and a continuation of Ser. No. 823,526, Jan. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 582,353, Feb. 22, 1984, abandoned. This application Apr. 24, 1987, Ser. No. 42,363

Int. Cl.[4] C08K 5/34, 5/49, 15/16

U.S. Cl. 524—100 5 Claims

1. A composition useful for inhibiting high energy radiation degradation of polypropylene, which comprises a mixture consisting essentially of (a) bis(2,2,-6,6-tetramethyl-4-piperidyl)sebacate, (b) 1,3,5-tris(3,5-di-t-butyl-4-hydroxybenzyl)-s-triazine, and (c) tris(2,4-di-t-butylphenyl) phosphite the weight ratios of the component (a) to the component (b) to the component (c) being about 1:(0.1–2):(0.1–2).

4,888,370

FLAME-RESISTANT POLYAMIDES

Dieter Freitag; Thomas Joswig; Karsten Idel, all of Krefeld; Heinz-Josef Füllmann, Leichlingen, and Friedemann Müller, Neuss, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany

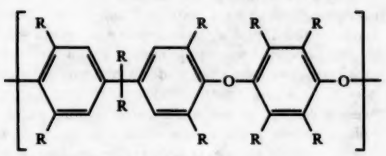
Continuation of Ser. No. 39,692, Apr. 20, 1987, abandoned. This application Sep. 7, 1988, Ser. No. 241,765

Claims priority, application Fed. Rep. of Germany, May 2, 1986, 3614899

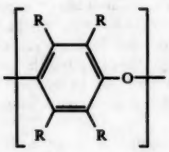
Int. Cl.[4] C08K 5/06; C08L 71/04

U.S. Cl. 524—100 8 Claims

1. A flame-resistant, thermoplastic polyamide moulding material comprising 0.01 to 2% by weight of a polyphenylene oxide as flameproofing agent, wherein the polyphenylene oxide has a molecular weight of 500 to 4,000 as measured by terminal —OH group determination, and has the repeating structural unit of the general formula



or



in which the radicals R, identically or differently, denote hydrogen or an alkyl or aryl radical.

4,888,371

BIS(2,6-DIS-TERT-BUTYL-4-BRANCHED PROPYL OR BUTYL PHENYL)-PENTAERYTHRITOL SPIRO PHOSPHITES AND SYNTHETIC RESIN COMPOSITIONS CONTAINING SUCH PHOSPHITES

Kenji Tajima, Kuwana; Tetsuo Tsuboi, Hatoyama, and Ryozo Arata, Toin, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

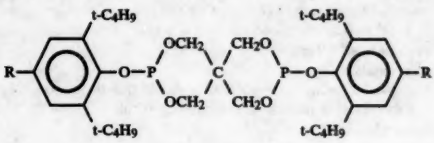
Filed Nov. 13, 1987, Ser. No. 120,564

Claims priority, application Japan, May 14, 1986, 61-110099

Int. Cl.[4] C08K 5/52; C07F 9/15

U.S. Cl. 524—120 17 Claims

1. Bis(2,6-di-tert-butyl-4-branched propyl or butyl phenyl)-pentaerythritol spiro phosphites having the formula:



wherein both R's are selected from the group consisting of isopropyl, iso-butyl, and sec-butyl.

5. A polyvinyl chloride resin composition having improved resistance to deterioration upon exposure to heat and light comprising a polyvinyl chloride resin formed at least in part of the recurring group:

and having a chlorine content in excess of 40%, where X is either hydrogen or chlorine; and a phosphite in accordance with claim 1.

4,888,372

HIGH SOLIDS SOLVENT-BASED POLYESTER COATING COMPOSITION

Sonja M. J. Abrams, Leuven, and Robert V. A. Vervoort, Deurne, both of Belgium, assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Jun. 23, 1988, Ser. No. 210,337

Int. Cl.[4] C08L 1/14, 67/08

U.S. Cl. 524—197 6 Claims

1. A coating composition with a binder consisting essentially, in percent by weight, of a binder consisting essentially of about

25–35% of a polyester resin,

20–30% of a melamine crosslinker resin,

2–6% of a polyurea plasticizer

3–6% of a ethylene vinyl acetate copolymer wax dispersion,

4–10% of a cellulose acetate butyrate resin,

15–30% of a styrenated acrylic resin with an isocyanate-amine thixotropic agent, so that the amount of thixotropic agent is 0.5–1.5% based on binder solids,

plus flow additives,

said binder being dispersed in a liquid media comprising solvents at a binder solids content of about 20–25% by weight.

4,888,373

HIGHER SOLIDS SOLVENT-BASED POLYSETER COATING COMPOSITION

Sonja M. J. Abrams, Leuven, Belgium, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 23, 1988, Ser. No. 210,336
Int. Cl.[4] C08L *1/14, 67/08*
U.S. Cl. 524—197 6 Claims

1. A coating composition with a binder consisting essentially, in percent by weight, of a binder consisting essentially of about

30–40% of a polyester resin,

25–35% of a melamine crosslinker resin,

2–5% of a ethylene vinyl acetate copolymer wax dispersion,

25–30% of a styrenated acrylic resin with an isocyanate-amine thixotropic agent, so that the amount of thixotropic agent is 0.5–2% based on binder solids,

plus flow additives,

acid catalyst,

said binder being dispersed in a liquid media comprising solvents at a binder solids content of about 35–40% by weight.

4,888,374

SILICONE RUBBER COMPOSITION

Masaharu Takahashi, and Takeo Yoshida, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1988, Ser. No. 229,496
Claims priority, application Japan, Aug. 11, 1987, 62-200401
Int. Cl.[4] C08L *23/00*
U.S. Cl. 524—227 13 Claims

1. A silicone rubber composition comprising an organopolysiloxane, a curing catalyst for said organopolysiloxane, and an N,N'-alkylenebisamide having not less than 10 carbon atoms, said organopolysiloxane having units of the following formula,

$$R_aSiO_{(4-a)/2}$$

in which R represents a monovalent hydrocarbon group having 1 to 10 carbon atoms, and a is a positive value o from 1,90 to 2.05, said curing catalyst being an organic peroxide, and said N,N'-alkylenebisamide being present in an amount effective in improving the mold releasing property and preventing adhesion of the silicone rubber to the core of an electric wire.

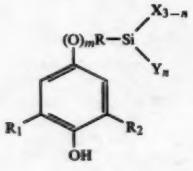
4,888,375

ORGANIC POLYMER STABILIZATION

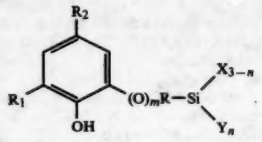
Alberto Greco; Luigi Cassar; Silvestro Costanzi, and Carlo Neri, all of Milan, Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy

Division of Ser. No. 733,524, May 13, 1985, abandoned. This application Sep. 28, 1987, Ser. No. 101,638
Claims priority, application Italy, May 21, 1984, 21024 A/84
Int. Cl.[4] C08K *5/24, 5/54*
U.S. Cl. 524—262 24 Claims

1. Stabilized polymer compositions comprising an organic polymer and a stabilizing quantity of a reactive antioxidant compound having the formula

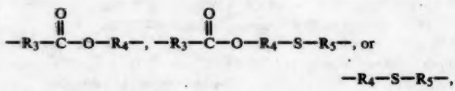


or the formula



wherein R_1 and R_2 are linear or branched alkyl radicals containing from 1 to 10 carbon atoms;

R is a linear or branched alkylene radical containing from 1 to 10 carbon atoms, or is



wherein R_3, R_4 and R_5 are linear or branched alkylene radicals containing 3 to 10 carbon atoms;

X is a linear or branched alkyl radical containing form 1 to 5 carbon atoms;

Y is hydrogen, halogen, C_1–C_4 acyloxy, C_1–C_4 alkyloxy, amino, amino-xoy, or silyloxy;

m is zero or 1; and

n is 1, 2 or 3.

4,888,376

CURABLE ORGANOPOLYSILOXANES FILLED WITH SILICON CARBIDE POWDERS AND HIGHLY DENSIFIED SINTERED BODIES THEREFROM

William H. Atwell; Gary T. Burns, and Chandan K. Saha, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 26, 1988, Ser. No. 248,884
Int. Cl.[4] C08K *3/00*
U.S. Cl. 524—401 50 Claims

1. A method of preparing a sintered body of silicon carbide, said method comprising

(a) forming a handleable green body by

(i) blending components consisting essentially of silicon carbide powder, a metal-containing sintering aid, an organopolysiloxane curing agent, and a preceramic organopolysiloxane to a uniform mixture, where the metal containing sintering aid is present at 0.1 to 3.0 weight percent of the metal based on the weight of silicon carbide powder, where the organopolysiloxane curing agent is present in an effective amount to cure, and where the preceramic organopolysiloxane is present at such a level that the free carbon value of the mixture is greater than 0.2 weight percent based on the total weight of the silicon carbide powder and the stable ceramic char derived from the preceramic organopolysiloxane, and (ii) then forming the uniform mixture into the desired shape under pressure at a temperature less than about 500° C. to obtain a handleable green body; and

(b) sintering the handleable green body in an inert atmosphere at a temperature greater than 1900° C. to obtain a sintered body of silicon carbide with a density greater than 2.4 g/cm^3.

4,888,377

COMPOSITION FOR MAKING PERMANENT IMPRESSIONS

Judith D. Strader, Shandon Star Route - Ross Dr., Paso Robles, Calif. 93446

Continuation-in-part of Ser. No. 643,093, Aug. 21, 1984, abandoned. This application Nov. 17, 1986, Ser. No. 931,210

Int. Cl.[4] C08J *00/00*

U.S. Cl. 524—425 3 Claims

1. A composition wherein it can receive and retain impressions while in an ungelled dough-like initial state and in that it can be baked to a rock-like state to preserve the impressions without bubbling and without scorching, said composition consisting essentially of:

about 14.3% by weight of an organic filler-free plastisol;

about 35.7% by weight of ground limestone, having a fineness of at least 325 mesh to enable the composition to receive impressions of fine detail;

about 50.0% by weight of sand having a fineness in the range of 30 to 80 mesh, said sand serving to prevent bubbles from forming during the baking so that the impressions will not be distorted by internal and surface bubbles; and,

about one teaspoon of salt for each 17.5 pounds of sand, said salt serving to prevent scorching during baking, whereby the baked composition has an attractive uniform color.

4,888,378

PLASTIC COMPOSITIONS CONTAINING SMALL PARTICLE SIZE ZEOLITES AND MIXTURES

John A. Kostinko, Bel Air, Md., assignor to J. M. Huber Corporation, Rumson, N.J.

Continuation-in-part of Ser. No. 572,122, Jan. 17, 1984, and Ser. No. 557,377, Dec. 1, 1983, which is a continuation of Ser. No. 349,787, Feb. 18, 1982, abandoned, which is a continuation of Ser. No. 93,345, Nov. 21, 1979, abandoned, which is a continuation-in-part of Ser. No. 88,243, Oct. 25, 1979, abandoned, which is a continuation-in-part of Ser. No. 971,584, Dec. 20, 1978, Pat. No. 4,235,856, said Ser. No. 572,122, is a continuation of Ser. No. 274,898, Jun. 18, 1981, abandoned, which is a continuation-in-part of Ser. No. 93,345, , and Ser. No. 88,243, , and Ser. No. 971,584, , and Ser. No. 189,419, Sep. 22, 1980, which is a continuation-in-part of Ser. No. 93,345, , and Ser. No. 88,243, , and Ser. No. 971,584,. This application Jun. 11, 1984, Ser. No. 619,456

Int. Cl.[4] C08K *3/34*

U.S. Cl. 524—450 2 Claims

1. A plastic composition which contains a zeolite as a filler, said zeolite being present in the form of small particles of said zeolite, said particles being selected from the group consisting of zeolite particles chemically similiar to zeolite X and mixtures of particles chemically similiar to mixtures of zeolite X and zeolite A, said particles having the chemical formula of zeolite X and zeolite A but differing from zeolite X and zeolite A in having larger ports or pore diameters, having bimodal pore size distribution, and having X-ray diffraction patterns depressed from those of zeolite X and zeolite A, and wherein said mixture of particles exhibits a narrow differential weight percent gaussian distribution with an average particle size of no more than about 2.2 microns with at least 90 percent of the weight between 0.1 and 5.0 microns in diameter, wherein the cumulative percent population exhibits at least 41 percent by weight less than one micron, with no more than 5 percent by weight greater than 3.2 microns in diameter, and a surface area of greater than 100 m^2/g.

4,888,379

HEAT-SENSITIVE POLYURETHANE DISPERSIONS

Wolfgang Henning, Kuerten; Wolfram V. Langenthal, Pulheim; Hermann Perrey, Krefeld, and Hellmut Striegler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 22, 1987, Ser. No. 64,680

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622612

Int. Cl.[4] C08L *75/08, 75/04*

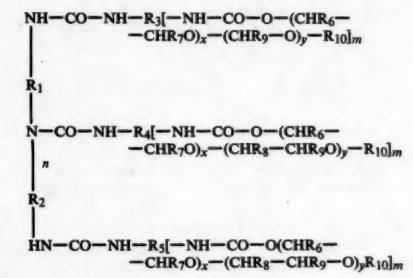
U.S. Cl. 524—500 5 Claims

1. Heat-sensitive polyurethane dispersions consisting essentially of

(a) polyurethane latex based on a dispersed polyurethane having a content of ionic group of 2 to 200 milliequivalents per 100 g of solid and a content of ethylene oxide units of 0 to 25% by weight, based on the solid,

(b) 0.01 to 20% by weight, based on the solid in latex (a), of electrolyte,

(c) 0.1 to 20% by weight, based on the solid in latex (a), water-soluble polyetherpolyurethane stabilizer corresponding to the formula



wherein

R_1 and R_2 independently represent C_2–C_4alkylene or C_3–C_4cycloalkylene,

R_3, R_4 and R_5 independently represent alkylene, cycloalkylene or arylene, which is unsubstituted or substituted by C_1–C_4-alkyl or halogen,

R_6, R_7, R_8 and R_9 independently represent hydrogen or methyl,

R_{10} represents C_1–C_{18} alkyl, C_6–C_{18} aryl, C_7–C_{18} aralkyl or C_2–C_{18} alkenyl,

n represents the values 0 to 50,

m represents the values 1 to 4

x represents the values 5 to 100, and

y represents the values 0 to 100.

4,888,380

CLEAR, NON-SLUMPING SILICONE SEALANTS

Russell P. Kamis, Bay County; Jerome M. Klosowski, Bay City, and Loren D. Lower, Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 26, 1988, Ser. No. 249,734

Int. Cl.[4] C08L *83/00*

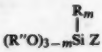
U.S. Cl. 524—588 10 Claims

1. A process of producing silicone sealants containing polydiorganosiloxane having alkoxy endblocking, alkoxy functional crosslinker and/or chain extender, and titanium catalyst, wherein the improvement comprises a method comprising

(A) mixing in the absence of moisture

(1) 100 parts by weight of a polymer of the formula

where each R is free of aliphatic unsaturation and is at least one selected from the group consisting of monovalent hydrocarbon, monovalent halohydrocarbon, and monovalent cyanoalkyl radicals of 1 to 18 inclusive carbon atoms, each D is selected from the group consisting of hydroxyl radical and radical of the formula



where each R'' is at least one selected from the group consisting of methyl, ethyl, propyl, and butyl, Z is a divalent hydrocarbon radical or a combination of divalent hydrocarbon radicals and siloxane radicals, m is 0 or 1, and x is of a value such that the polymer has a viscosity of from 0.5 to 3000 Pa.s at 25° C.,

(2) from 0.1 to 14 parts by weight of a alkoxysilane of the formula

where R' is at least one selected from the group consisting of methyl, ethyl, propyl, phenyl, and vinyl, R'' is as defined above, and a is 0, 1 or 2, and

(3) from 0.2 to 6.0 parts by weight of titanium catalyst, and

(B) adding after the above are mixed,

(4) from 5 to 60 parts by weight of reinforcing filler, then

(C) storing the mixture in the absence of moisture,

to give a sealant which is stable in the absence of moisture and has a slump of less than 1 inch when measured in accordance with ASTM D 2202.

4,888,381

ADHERABLE POLYSTER FILM

Richard P. Pankratz, Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 14, 1988, Ser. No. 206,431
Int. Cl.[4] C08L *67/02*
U.S. Cl. 524—751 **23 Claims**

9. A process for preparing an aqueous, film-forming coating emulsion of a carboxylated copolyester composition consisting essentially of a copolymer of a mixture of dicarboxylic acids, the total amount of the acid components being 50 mole percent, with at least one diol, the total amount of diol component being 50 mole percent, the copolymer being further modified by esterifying the terminal hydroxyl groups by treatment with an anhydride of a dicarboxylic acid, or by pyrolysis of the copolyester, thus providing terminal carboxyl groups, the acid number of the carboxylated copolyester being about 3–20;

said process comprising the following sequential steps:

(a) dissolving the carboxylated copolyester in an organic solvent selected from the group consisting of tetrahydrofuran and mixtures of tetrahydrofuran with at least one other organic cosolvent selected from the group consisting of methanol, acetone, dioxane, dimethoxyethane, and methyl ethyl ketone, the amount of a cosolvent other than methyl ethyl ketone or total amount of such cosolvents being at most about 25 weight % of the solvent mixture, and the amount of methyl ethyl ketone being at most about 75 weight % of the solvent mixture, the balance in each case being tetrahydrofuran;

(b) neutralizing the carboxylic groups with an inorganic base, ammonia, or an organic amine;

(c) adding a sufficient amount of water with good agitation to cause emulsification; and

(d) evaporating the organic solvent.

4,888,382

SHELF STABLE SILICONE CAULKING MATERIALS

Judith Stein, Schenectady, and Tracey M. Leonard, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 31, 1988, Ser. No. 200,477
Int. Cl.[4] C08K *3/26*; C08G *77/06*
U.S. Cl. 524—788 **4 Claims**

1. Silicone caulking composition consisting essentially of by weight

(A) 100 parts of a base mixture consisting essentially of an aqueous emulsion having a pH of from 9 to 11, and a solids concentration of 30% to 70% by weight, consisting essentially of a silanol-terminated polydiorganosiloxane stabilized by an anionic surfactant,

(B) up to 50 parts of a nonsiliceous filler,

(C) 0.3 to 2 parts of a tin catalyst,

(D) 0.1 to 5 parts of a reaction product of an alkyl silicate and neopentylalcohol.

4,888,383

METHOD FOR AQUEOUS DISPERSION OF POLYURETHANE MODIFIED POLYACRYLICS

Jozef T. Huybrechts, Oud-Turnhout, Belgium, assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Aug. 3, 1988, Ser. No. 228,003
Int. Cl.[4] C08J *3/02*
U.S. Cl. 524—832 **17 Claims**

1. A method of preparing a stable aqueous dispersion of polyurethane-urea modified polyacrylic comprising

a. preparing a reaction mixture in the form of an aqueous dispersion or emulsion of primary amine-functional or hydrazide-functional polyacrylic,

b. adding to the reaction mixture an isocyanate terminated prepolymer or a diisocyanate, and

c. reacting the resultant mixture to cause chain extension to form a polyurethane-urea modified polyacrylics.

4,888,384

STABLE, TWO PACKAGE WATER EMULSIONS OF SILICONE HYDRIDE FLUIDS

Frank J. Traver, Troy, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Oct. 21, 1987, Ser. No. 111,390
Int. Cl.[4] C08L *83/07, 83/05, 83/06*
U.S. Cl. 524—862 **1 Claim**

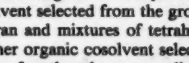
1. A curable silicone composition in two packages, the first package comprising a continuous water phase and a discontinuous oil phase comprising:

(i) a vinyl containing silicone, and

(ii) from about 1 to 300 ppm platinum catalyst based on the oil phase; and

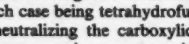
the second package comprising a continuous water phase and a discontinuous oil phase comprising:

(a) silicone hydrides containing units of the formula:



where a may be 0, 1 or 2; b may be 1 or 2; a+b may be 1, 2 or 3; and R is a substituted or unsubstituted hydrocarbon radical of 1 to 12 carbon atoms; and

(b) hydroxy substituted silicone containing units of the formula:



wherein c is 1, 2 or 3; d is 1 or 2; c+d may be 2, 3, or 4;

and R is a substituted or unsubstituted hydrocarbon radical of from 1 to 12 carbon atoms;

wherein the viscosity of the hydroxy substituted silicone has a viscosity of from about 10 to 500 centipoise at 25° C.; and wherein the ratio of hydroxy functionality to hydride functionality ranges from about ¼ to about 17/1.

4,888,385

BOP REAGENT FOR SOLID PHASE PEPTIDE SYNTHESIS

Derek Hudson, San Anselmo, Calif., assignor to Millipore Corporation, Bedford, Mass.

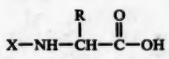
Filed Apr. 30, 1987, Ser. No. 44,185

Int. Cl.[4] A61K *37/43*; C07K *7/10*

U.S. Cl. 525—54.11 **16 Claims**

1. A method of coupling amino acids to the reactive functionality of a synthesis resin or unprotected amine group of the last amino acid residue in sold phase peptide synthesis, comprising:

reacting a protected amino acid of the formula



wherein X is an amine protecting group and R is the amino acid side chain in the presence of Benzotriazolyloxytris(dimethylamino)phosphonium hexafluorophosphate (BOP Reagent) and a carboxyl group ionizer (base) and a coupling efficiency increasing amount of hydroxybenzotriazole (HOBt).

4,888,386

COMPOSITION FOR THE PAINT DETACKIFICATION FOR BOTH WATERBORNE AND SOLVENT ENAMELS

Shu-Jen W. Huang, Naperville, and David W. Scheimann, Addison, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Feb. 21, 1989, Ser. No. 312,795

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

Int. Cl.[4] C08L *29/04*; B08B *7/00*

U.S. Cl. 525—57 **1 Claim**

1. A paint spray booth detackifier composition for detackifing both waterborne and solvent enamel compositions consisting of a melamine-formaldehyde polymer (A), polyvinyl alcohol (B), and a styrene acrylate copolymer (C) combined in a weight ratio of A:B:C, being within the range of 2:0.1:1 to 4:0.5:1.

4,888,387

RESIN COMPOSITION COMPRISING A POLYAMIDE OR POLYCARBONATE

Akihiro Wada, Inagi; Rin-ichi Kakuta, Tokyo; Kenji Ohuchi, Yokohama; Jun Sugiyama, Yokohama, and Shinji Hasegawa, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 8, 1989, Ser. No. 320,634

Claims priority, application Japan, Mar. 10, 1988, 63-055038; Mar. 24, 1988, 63-070455

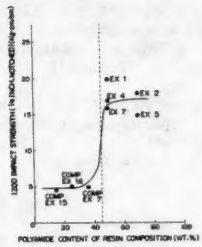
Int. Cl.[4] C08L *77/00, 69/00*

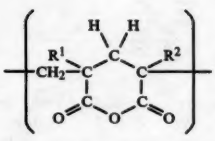
U.S. Cl. 525—66 **15 Claims**

1. A resin composition comprising:

(A) a copolymer comprising

(a) 5 to 74.5% by weight of hexagonal units selected from the group consisting of hexagonal acid anhydride units of the formula:

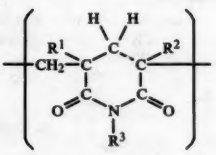




(I)

wherein each of R^1 and R^2 independently represents a hydrogen atom or a methyl group,

hexagonal imide units of the formula:



(II)

wherein R^1 and R^2 are as defined above, and R^3 is a member selected from the group consisting of a hydrogen atom, an alkyl group, a cycloalkyl group and an aryl group,

and mixtures thereof;

(b) 20 to 89.5% by weight of methyl methacrylate units;

(c) 0 to 69.5% by weight of aromatic vinyl compound units; and

(d) 0.5 to 20% by weight of methacrylic acid units or acrylic acid units,

with the proviso that the sum of components (a), (b), (c) and (d) is 100% by weight,

(B) a graft copolymer rubber comprising an elastomer having a glass transition temperature of up to −30° C. and a graft component grafted thereto, said graft component comprising aromatic vinyl compound units and methacrylic ester units, the weight proportion of said graft component relative to said elastomer being at least 20%, and

(C) at least one polymer selected from the group consisting of a polyamide and a polycarbonate,

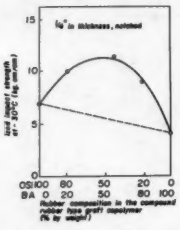
the weight proportion of the copolymer (A) relative to the total weight of components (A), (B) and (C) being 5 to the weight proportion of the graft copolymer rubber (B) relative to the total weight of components (A), (B) and (C) being 5 to 50%, and the weight proportion of the polymer (C) relative to the total weight of components (A), (B) and (C) being 45 to 80%.

4,888,388

POLYCARBONATE RESIN COMPOSITION

Masafumi Hongo, Hatsukaichi; Hideyuki Shigemitsu, Otake; Naoki Yamamoto, Hiroshima, and Akira Yanagase, Otake, all of Japan, assignors to Mitsubishi Rayon Company Limited, Tokyo, Japan

Filed Sep. 20, 1988, Ser. No. 246,612
Claims priority, application Japan, Sep. 21, 1987, 62-236229; Mar. 10, 1988, 63-57041
Int. Cl.[4] C08L 69/00
U.S. Cl. 525—67 9 Claims



1. A polycarbonate resin composition comprising a polycarbonate resin (A) or a mixture (A') of a polycarbonate resin with a saturated polyester resin and/or a polyester elastomer, and a compound rubber type graft copolymer (B) having at least one vinyl monomer graft-polymerized onto a compound rubber composed of from 10 to 90% by weight of a polyorganosiloxane rubber and from 10 to 90% by weight of a polyalkyl (meth-)acrylate rubber in a total amount of 100% by weight in an inseparable interlocking fashion and having an average particle size of from 0.08 to 0.6 μm, or a mixture (B') of such a compound rubber type graft copolymer (B) with a vinyl polymer, wherein component (B) or (B') is in an amount such that the compound rubber is from 0.5 to 60% by weight based on the entire resin composition.

4,888,389

AMPHIPHILIC POLYMERS AND METHOD OF MAKING SAID POLYMERS

Joseph P. Kennedy, and Yuji Hongu, both of Akron, Ohio, assignors to University of Akron, Akron, Ohio

Filed Feb. 5, 1985, Ser. No. 698,453
Int. Cl.[4] C08F 8/00
U.S. Cl. 525—131 17 Claims

1. An amphiphilic polymer composed of at least one poly A segment and at least one poly B segment that are coupled together by reaction with an organic polyisocyanate to form urethane groups,

said poly A segment being an aromatic moiety or moieties-terminated polyolefin having monomer residues residing therein containing from 4 to about 12 carbon atoms with at least one of said aromatic moities containing a hydroxyl group, and said poly B segment being an alkylene oxide polymer of ethylene oxide or propylene oxide having at least one terminal hydroxyl group.

4,888,390

RUBBERY COMPOUNDS AS MODIFIERS FOR POLY(ARYLENE SULFIDE)

Yeon F. Liang, and William H. Beever, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 552,884, Nov. 17, 1983, Pat. No. 4,581,411. This application Nov. 27, 1985, Ser. No. 802,282
Int. Cl.[4] C08L 81/04
U.S. Cl. 525—189 3 Claims

1. A molding composition comprising poly(arylene sulfide) and an impact strength and/or crack resistance improving amount of ethylene-propylene-diene rubber.

4,888,391

PAINTABLE THERMOPLASTIC POLYOLEFIN COMPOSITIONS HAVING IMPROVED FLEXURAL PROPERTIES

Joseph D. Domine, Humble, and Anton J. Buchner, Houston, both of Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Aug. 12, 1988, Ser. No. 231,569
Int. Cl.[4] C08L 3/16, 23/10, 33/02, 33/06
U.S. Cl. 525—221 11 Claims

1. A molded part having good paint adhesion and a lowered Secant Flexural Modulus molded from a thermoplastic polyolefin composition consisting essentially of from 70 wt % to 85 wt % polypropylene and ethylene/propylene copolymer elastomer and from 15 wt % to 30 wt % of a terpolymer consisting essentially of ethylene, 5 wt % to 25 wt % methyl acrylate and 4.5 wt % to 8 wt % acrylic acid.

4,888,392

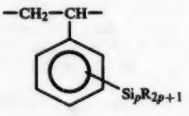
COPOLYMER OF SULFUR DIOXIDE AND POLYALKYLPOLYSILYLSTYRENE

Minoru Matsuda, Izumishi; Seiki Itoh, and Hiroshi Ono, both of Yokohamashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Jul. 22, 1988, Ser. No. 223,115
Claims priority, application Japan, Nov. 16, 1987, 62-289133
Int. Cl.[4] C08F 30/08
U.S. Cl. 526—279 7 Claims

1. A copolymer of sulfur dioxide and polyalkylpolysilylstyrene comprising a linear compound composed of 1 to 50 mol % of structural units of the formula:

and 50 to 99 mol % of structural units of the formula:



where R is a lower alkyl group and p is an integer between 2 and 5, and having a number-average molecular weight of 2,000 to 2,000,000.

4,888,393

CARBOXYL MODIFIED OLEFINIC COPOLYMER COMPOSITIONS

Frank C. Cesare; William P. Whelan, Jr., both of Woodbury; Henno A. Petersen, Sandy Hook, all of Conn.; Thomas S. Coolbaugh, Arlington, Mass., and Robert G. Davis, Naugatuck, Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Division of Ser. No. 606, Jan. 5, 1987, Pat. No. 4,767,806. This application May 19, 1988, Ser. No. 196,162
Int. Cl.[4] C08F 255/04, 255/06, 255/02
U.S. Cl. 525—285 10 Claims

1. A non-thermoplastic carboxyl modified polyolefin copolymer comprising the reaction product of

a. an ethylene/alphaolefin copolymer having a number average molecular weight ranging from 250 to 15,000 with vinylidene termination unsaturation on at least 50% of the copolymer chains, wherein the alphaolefin has the formula $H_2C{=}CHR$, wherein R is an alkyl radical having 1 to 10 carbon atoms, and

b. an unsaturated carboxylic acid or anhydride containing three or more carbon atoms and at least one carboxyl group.

4,888,394

PROCESS TO GRAFT STEREOREGULAR POLYMERS OF BRANCHED, HIGHER ALPHA-OLEFINS AND COMPOSITIONS THEREOF

Edwin Boudreaux, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 15, 1988, Ser. No. 207,364
Int. Cl.[4] C08F *267/04*
U.S. Cl. 525—285 35 Claims

1. A process comprising:

(a) contacting a stereoregular polymer of branched, higher alpha-olefins which have been stabilized with at least one hindered phenol, wherein said hindered phenol is present in the range of about 0.05 to about 2 parts by weight of hindered phenol per 100 parts by weight polymer;

(b) with a grafting compound selected from the group consisting of vinyl-polymerizable, unsaturated, hydrolyzable silanes; carboxylic acids; carboxylic acid derivatives; carboxylic acid anhydrides; carboxylic acid anhydride derivatives; and mixtures thereof;

(c) in the presence of a free radical generator;

(d) in a melt at a temperature in the range of the melting temperature of hte polymer to about the decomposition temperature of the polymer.

4,888,395

CORE/SHELL POLYMERS AND IMPROVED SEALABLE ARTICLES TREATED WITH THE SAME

Taeik Min, Pittsford, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 2, 1987, Ser. No. 69,047
Int. Cl.[4] C08F *279/02*
U.S. Cl. 525—301 8 Claims

1. A core/shell polymer for an emulsion polymerized latex formulation, comprising from about 1% to about 50% by weight of a rubber core and about 50% to about 99% by weight of a thermoplastic polymer shell based on the total weight of the core/shell polymer, said thermoplastic polymer shell having a glass transition temperature in the range from about −30° C. to about 25° C. comprising a terpolymer polymerized from about 30 to about 80 percent by weight of a first monomer selected from the group consisting of ethylacrylate, butylacrylate, hexylacrylate, isooctylacrylate, methylacrylate, vinylidene chloride and mixtures thereof, from about 10 to about 60 percent by weight of a second monomer selected from the group consisting of vinylacetate, methylmethacrylate, styrene, ethylmethacrylate, isobutylmethacrylate and mixtures thereof and from about 0.1 to about 10 percent by weight of a third monomer selected from the group consisting of methacrylic acid, acrylic acid, itaconic acid, sulfoethylmethacrylate, maleic acid and mixtures thereof, based on the total monomer weight, with the proviso that each of said first, second and third monomers are different.

4,888,396

NOVEL CATIONIC ACRYLAMIDE POLYMERS AND PROCESSES FOR THEIR PREPARATION

Herbert K. Reimschuessel, Morristown, N.J.; William G. Chiang, and George J. W. Tichenor, both of Fayetteville, N.Y., assignors to Polypure, Inc., Solvay, N.Y.

Division of Ser. No. 13,517, Feb. 11, 1987, Pat. No. 4,777,218, which is a continuation-in-part of Ser. No. 8,132, Jan. 22, 1987, abandoned, which is a continuation of Ser. No. 684,756, Dec. 21, 1984, abandoned, and Ser. No. 785,949, Oct. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 753,557, Jul. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 640,262, Aug. 13, 1984, abandoned. This application Jun. 8, 1988, Ser. No. 203,835
Int. Cl.[4] C08F *8/30*
U.S. Cl. 525—379 28 Claims

1. A process of preparing caationic, water-soluble, high molecular weight polymers comprising reacting a preformed solid polymer containing pendant amide groups with an alkyl epoxide compound in the presence of a solvent for the alkyl epoxide and which swells said polymer and heating the resulting reaction mixture containing said swoller. polymer at a sufficient temperature and period of time to complete the reaction.

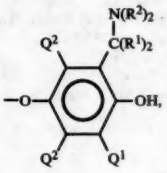
4,888,397

FUNCTIONALIZED POLYPHENYLENE ETHER FROM POLYPHENYLENE ETHER CHAIN TERMINATED WITH PHENOXY MOIETY CONTAINING AMINO AND HYDROXY GROUP

Roelof van der Meer, Bergen op Zoom, Netherlands, and John B. Yates, III, Glenmont, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 885,497, Jul. 14, 1986. This application Feb. 24, 1989, Ser. No. 314,866
Claims priority, application Netherlands, Jul. 24, 1985, 8502116
Int. Cl.[4] C08L *71/04*; C08G *65/48*
U.S. Cl. 525—391 27 Claims

1. A method for functionalizing a polyphenylene ether containing a substantial proportions of end groups of the formula



(II)

wherein:

each Q^1 is independently halogen, primary or secondary lower alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms;

each Q^2 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy or halohydrocarbonoxy as defined for Q^1;

each R^1 is independently hydrogen or alkyl, the total number of carbon atoms in both R^1 radicals being 6 or less; and

each R^2 is independently hydrogen or C_{1-6} primary alkyl;

which comprises mixing said polyphenylene ether in the melt, in the absence of free radical initiators, with at least one functionalizing compound having within its molecular structure at least one carbon-carbon double or triple bond and at least one carboxylic acid, acid anhydride, acid amide, imide, ester, amino or hydroxy group.

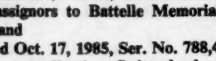
4,888,398

BIODEGRADABLE POLYPEPTIDE AND THE USE THEREOF FOR THE GRADUAL RELEASE OF DRUGS

Daniel Bichon, Gaillard, France, and Bernard Lamy, Carouge, Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland

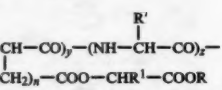
Filed Oct. 17, 1985, Ser. No. 788,408
Claims priority, application Switzerland, Oct. 19, 1984, 5021/84-9
Int. Cl.[4] C08G *69/08;* A61K *9/52*
U.S. Cl. 525—420 7 Claims

1. A polypeptide comprising a member of the group consisting of (a) biodegradable polymers corresponding to the formula



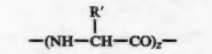
(I)

in which R^1 is a lower alkyl or hydrogen, R being a substituted or unsubstituted aliphatic radical or aromatic radical; or R and R^1 are bound to one another to form a hydrocarbon bridge of two or three links which may or may not be substituted; and (b) polymers corresponding to the formula:



(II)

wherein the groups R and R^1 have the meanings given above and wherein



is an uncarboxylated or carboxylated amino acid moiety of which the —COOH is free or partially or completely esterified; n is 1 or 2 and x which is equal to y+z is selected so that the molecular weight of the polypeptide is not less than 5000 D.

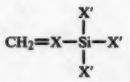
4,888,399

POLYESTER GRAFT COPOLYMERS, FLEXIBLE COATING COMPOSITIONS COMPRISING SAME AND BRANCHED POLYESTER MACROMERS FOR PREPARING SAME II

Rose A. Ryntz, Clinton Township, Lenawee County, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 942,226, Dec. 16, 1986, Pat. No. 4,810,759.
This application Oct. 3, 1988, Ser. No. 251,741
Int. Cl.[4] C08G *18/83, 18/68*
U.S. Cl. 525—440 23 Claims

1. Hydroxy functional carbon-carbon double bond bearing branched polyester urethane macromer consisting of the reaction product of reactants consisting of (i) hydroxy functional polyester urethane reactant having about 1-10 urethane groups per molecular with (ii) silane compound having the general chemical formula:



wherein X is an organic group or $(—Si—O—)_n$, being 1-50, and X' is independently (a) an organic group, (b) an organic group comprising hydroxy-reactive functionality or (c) hydroxy-reactive functionality, at least one X' comprising hydroxy-reactive functionality; said polyester urethane consists of the hydroxy terminated esterification product of a polyol and a dicarboxylic acid or anhydride thereof and an organic diisocyanate.

4,888,400

PREPARATION OF BRANCHED THERMOPLASTIC POLYCARBONATE FROM POLYCARBONATE AND POLYHYDRIC PHENOL

Eugene P. Boden, Scotia, and Herman O. Krabbenhoft, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,380
Int. Cl.[4] C08G *63/62*
U.S. Cl. 525—462 6 Claims

1. A process for the preparation of a thermoplastic, branched-chain, polycarbonate which comprises reacting a linear aromatic polycarbonate with a polyhydric phenol having more than two hydroxy groups per molecule in the presence of a catalytic amount of a carbonate equilibration catalyst.

4,888,401

MOLDING MATERIAL FOR OPTICS

Takao Kawaki, Tokyo; Yasuhiko Kijima; Yuh Miyauchi, both of Chiba; Eizi Ukita; Toru Nakajima, both of Tokyo, and Mituhiko Masumoto, Osaka, all of Japan, assignors to Mitsubishi Gas Chemical Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 202,866
Claims priority, application Japan, Jun. 5, 1987, 62-139819; Aug. 13, 1987, 62-200781; Nov. 5, 1987, 62-278327
Int. Cl.[4] C08F *283/02*
U.S. Cl. 525—468 9 Claims

1. A molding material for optics consisting essentially of a graft copolymer consisting essentially of a styrene resin selected from the group consisting of a polystyrene, a styrene/maleic anhydride copolymer, a styrene/maleimide copolymer and a styrene/maleic anhydride/maleimide copolymer and an aromatic polycarbonate, wherein:

(1) said graft copolymer has a weight average molecular weight on a polystyrene conversion (Mw) satisfying formula (1):

$$30{,}000 \leqq Mw \leqq 250{,}000 \quad (1)$$

(2) said aromatic polycarbonate unit has a weight average molecular weight on a polystyrene conversion (PCMw) satisfying formula (2):

$$10{,}000 \leqq PCMw \leqq 80{,}000 \quad (2)$$

wherein, in cases where the graft copolymer comprises a styrene resin as a main polymer, PCMw can be obtained by (Mw−PSMw)/Gn, wherein PSMw is a weight average molecular weight of a styrene resin; and Gn is an averaged number of grafting points per styrene resin main chain polymer;

(3) said styrene resin unit of the graft copolymer has a weight average molecular weight (PSMw) satisfying formula (3):

$$20{,}000 \leqq PSMw \leqq 200{,}000 \quad (3)$$

wherein, in cases where the graft copolymer comprises an aromatic polycarbonate as a main chain polymer, PSMw is a value measured on a residua styrene resin after removal of the aromatic polycarbonate from the graft copolymer by hydrolysis;

(4) the ratio of the partial molecular weight of the polycarbonate unit to that of the styrene resin unit (PCMw/PSMw) satisfies formula (4):

$$0.1 \leqq PCMw/PSMw \leqq [4]2 \quad (4)$$

and

(5) the weight ratio of the polycarbonate unit to the styrene resin unit satisfies formula (5):

$$30/70 \leqq PC/PS \leqq 90/10 \quad (5)$$

wherein PC is a weight of the aromatic polycarbonate unit; and PS is a weigh of the styrene resin unit; said resin composition having a micro-disperse phase of 0.5μ or less.

4,888,402

COPOLYMES FORMED FROM N-HYDROXYPHENYLMALEINIMIDE (DERIVATIVES) AND ALLYL COMPOUNDS

Martin Roth, Giffers; Peter Flury, Himmelried, and Sameer H. Eldin, Fribourg, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 29, 1987, Ser. No. 79,056

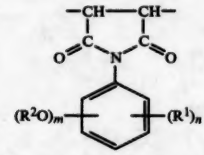
Claims priority, application Switzerland, Aug. 6, 1986, 3156/86

Int. Cl.[4] C08F *22/40*

U.S. Cl. 526—262 **7 Claims**

1. A copolymer which comprises

(a) a first structural unit of the formula



in which

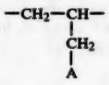
R^1 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, or halo,

R^2 is hydrogen or CO-alkyl in which alkyl contains from 1 to 20 carbon atoms,

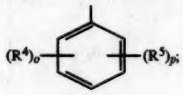
m has a value of 1 to 3, and

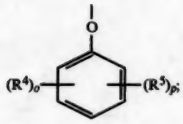
n has a value of 0 to 4, the sum of m and n not exceeding 5; and

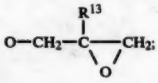
(b) a second structural unit of the formula



in which A is a glycidyl-containing member selected from the group consisting of

(i) 

(ii) 

(iii) 

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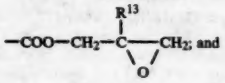
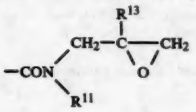
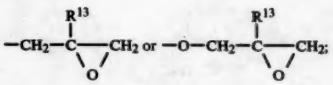
(iv) 

(v) 

in which

R^4 is

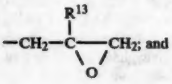


R^5 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halogen,

o has a value of 1 to 3;

p has a value of 0 to 4, the sum of o and p not exceeding 5;

R^{11} is hydrogen, alkyl of 1 to 20 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, unsubstituted or substituted aryl or aralkyl, or



R^{13} is hydrogen or methyl, the mol % ratio of said first structural unit to said second structural unit being from 5:95 to 95:5.

4,888,403

PROCESS FOR PRODUCING PLASTIC-LIKE WOODY MOLDINGS FROM DIBASIC ACID ANHYDRIDES AND UNSATURATED MONOGLYCIDYL ETHERS

Minoru Ueda; Hideaki Matsuda, and Hideki Mori, all of Kagawa, Japan, assignors to Okura Kogyo Kabushiki Kaisha, Japan

Filed Jan. 26, 1988, Ser. No. 148,574

Claims priority, application Japan, Jan. 26, 1987, 62-14224

Int. Cl.[4] C08B *3/22*

U.S. Cl. 527—103 **19 Claims**

1. A process for producing a woody molding, which comprises applying pressure capable of plasticizing at least the woody component of the compositions, at a temperature of from 120° C. to 180° C., to a composition comprising (A) an oligoesterified woody material obtained by alternately adducting a dibasic acid anhydride and a monoepoxy compound having an unsaturated double bond to the hydroxy groups of a woody material and (B) an oligomer obtained from a dibasic acid anhydride and a monoepoxy compound having an unsaturated double bond, whereby plasticization and crosslinking by the polymerization of the unsaturated double bonds occurs.

4,888,404
METHOD OF IMPROVING SHELF LIFE OF SILICONE ELASTOMERIC SEALANT

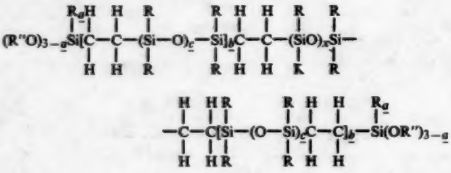
Jerome M. Klosowski, Monitor Township, Bay County, and Michael D. Meddaugh, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 835,814, Mar. 3, 1986, Pat. No. 4,871,827. This application Feb. 27, 1989, Ser. No. 315,978

Int. Cl.[4] C08G 77/06

U.S. Cl. 528—15 3 Claims

1. A silicone polymer of the formula,



where each R is free of aliphatic unsaturation and is selected from the group consisting of monovalent hydrocarbon, monovalent halohydrocarbon, and monovalent cyanoalkyl radicals of 1 to 18 inclusive carbon atoms, each R'' is methyl, ethyl, propyl, or butyl, a is 0 or 1, b is 1, c is from 1 to 6, and x is of a value such that the polymer has a viscosity of from 0.5 to 3000 Pa.s at 25° C.

4,888,405
PREPARATION AND PROCESSING OF MIXTURES CONTAINERS ORGANOCYCLOSILOXANES

Norbert Gamon, Seevetal; Christian Solbrig, Mehring-Öd, and Karl Braunsperger, Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 10, 1988, Ser. No. 230,398

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727182

Int. Cl.[4] C08G 77/06

U.S. Cl. 528—23 18 Claims

1. A process for preparing an organocyclosiloxane-containing mixture which is suitable as the starting material in the preparation of silicones having a reproducible viscosity, which comprises treating with a condensation catalyst a mixture containing organocyclosiloxanes and short-chain, linear organopolysiloxanes which is obtained as distillate from the product mixture formed in the preparation of linear organopolysiloxanes.

4,888,406
POLYMERIZABLE MONOMER CONTAINING SILICONS AND PREPARATION THEREOF

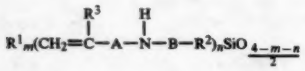
Hiroharu Ohsugi; Yoshio Eguchi, both of Osaka; Satoshi Urano; Ryuzo Mizuguchi, both of Kyoto, and Mitsuhiro Takarada, Gunma, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Dec. 21, 1987, Ser. No. 135,302

Int. Cl.[4] C08G 77/20

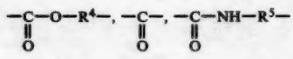
U.S. Cl. 528—32 25 Claims

1. A polymerizable silicon-containing monomer represented by the formula (I):

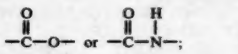


(I)

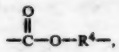
wherein R^1 represents a substituted or unsubstituted monovalent hydrocarbon radical; R^2 represents a substituted or unsubstituted alkylene attached to a silicon atom; m and n each represents a positive number fulfilling the requirement of $2 \leqq m+n \leqq 4$; R^3 is a hydrogen atom or a methyl group; A is a direct bond,



or a substituted or unsubstituted phenylene: B is



R^4 and R^5 each represents an alkylene, providing that when A represents



m+n is 2.

4,888,407
IMIDE COMPOUND AND COMPOSITION CONTAINING THE SAME

Saito Yasuhisa, Higashiosaka; Kunimasa Kamio, Suita; Mitsuhiro Shibata, Yao; Katsuya Watanabe, Takatsuki; Yutaka Shiomi, Hirakata, and Youichi Ueda, Kashihara, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan

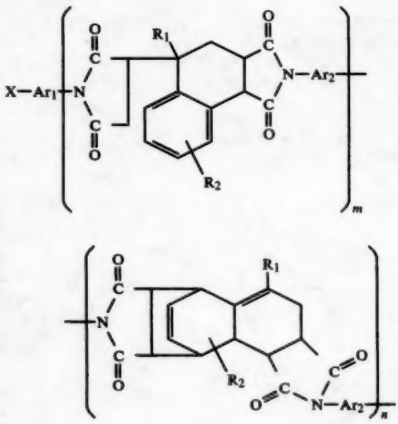
Filed Dec. 28, 1987, Ser. No. 138,084

Claims priority, application Japan, Dec. 26, 1986, 61-314259; Dec. 26, 1986, 61-314260; Jun. 23, 1987, 62-157329; Jun. 23, 1987, 62-157330; Jun. 23, 1987, 62-157331

Int. Cl.[4] C08L 63/00, 79/08

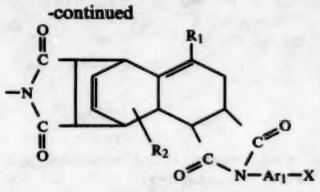
U.S. Cl. 525—423 22 Claims

1. An epoxy resin composition comprising as essential components an epoxy resin (A) and an imide compound (B) represented by the general formula (I),



(I)

-continued



wherein X represents an $—NH_2$ group and/or —OH group, Ar_1 and Ar_2 independently represent an aromatic residue, R_1 represents a hydrogen atom or an alkyl group having from 1 to 10 carbon atoms, R_2 represents a hydrogen atom, an alkyl or alkoxy group having from 1 to 20 carbon atoms or hydroxyl group, and each of m and n represents a number of from 0 to 30.

4,888,408

POLYMERIC POLYHYDROXY POLYETHER CONTAINING 1,6-DIAZASPIRO-[4.4]NONANE-2,7-DIONE UNITS

Pen C. Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 175,023, Mar. 30, 1988, abandoned. This application Sep. 27, 1988, Ser. No. 249,934

Int. Cl.[4] C08G *52/26, 69/14*

U.S. Cl. 528—96 **14 Claims**

1. A linear, polymeric, polyhydroxy polyether having alternating moieties of (1) a [4.4] spirodilactam having spiro ring nitrogen atoms in the 1- and 6-ring positions and having an oxyaryl-containing substituent on each spiro ring nitrogen atom, and (2) a 2-hydroxy-1,3-propylene connecting group.

4,888,409

THERMOTROPIC COPOLYAZOMETHINES AND PROCESS FOR PREPARING THEM

Ugo Pedretti; Cesarina Bonfanti, both of Milan; Enrico Montani, San Donato Milanese; Hassan A. Hakemi, San Donato Milanese, and Arnaldo Roggero, San Donato Milanese, all of Italy, assignors to Eniricerche S.p.A., Milan, Italy

Filed Dec. 6, 1988, Ser. No. 280,746

Claims priority, application Italy, Dec. 22, 1987, 23152 A/87

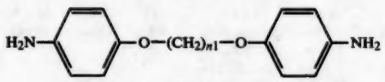
Int. Cl.[4] C08G *14/02*

U.S. Cl. 528—129 **5 Claims**

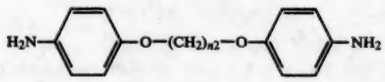
1. Thermotropic copolyazomethines having a nematic phase at temperatures over 24020 C. and containing in the macromolecule alternated units derived from:

(A) terephthalic aldehyde

(B) a 1,n-bis(4-aminophenoxy)alkane:



(C) at least one 1,n-bis-(4-aminophenoxy)alkane



wherein: n_1 is an integer selected in the range from 2 to 10, n_2 is an integer selected in the range from 5 to 11, with the proviso that n_1 is different from n_2, the (A) units being present in the copolyazomethine in an amount equal to the sum of the units (B) and (C).

4,888,410

POLYCARBONATE END CAPPED WITH PENTAHALOPHENOXY GROUP

Takashi Komatsu, and Eiichi Terada, both of Ichihara, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1988, Ser. No. 217,465

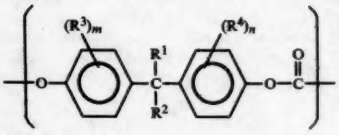
Claims priority, application Japan, Aug. 7, 1987, 62-196268

Int. Cl.[4] C08G *63/62*

U.S. Cl. 528—198 **7 Claims**

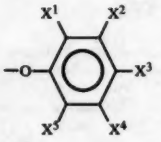
1. A polycarbonate having:

a main chain comprising a repeating unit presented by the formula (A):



wherein R^1 to R^4 are each a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and m and n are each an integer of 1 to 4;

a pentahalogenophenoxy group represented by the formula (B):



wherein X^1 to X^5 are each a halogen atom, at the terminal thereof, the ratio of the molar fraction of the pentahalogenophenoxy group (b) to the molar fraction of the repeating unit of the general formula (A) (a) plus the molar fraction of the pentahalogenophenoxy group (b) represented by b/(a+b) being 0.03 : 1 to 0.05 : 1; and

a viscosity average molecular weight of at least 15,000.

4,888,411

CROSSLINKABLE POLYCYCLIC POLYCARBONATE OLIGOMER AND METHODS FOR THEIR PREPARATION AND USE

Thomas G. Shannon, Schenectady, and Daniel J. Brunelle, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 913,908, Oct. 1, 1986, Pat. No. 4,794,160, which is a division of Ser. No. 801,437, Nov. 25, 1985, abandoned. This application Jun. 20, 1988, Ser. No. 208,515

Int. Cl.[4] C08G *63/62*

U.S. Cl. 528—199 **7 Claims**

1. A method for preparing a composition comprising polycyclic polycarbonate or thiol analog oligomers which comprises contacting (A) a composition comprising a mixture of (1) at least one compound having the formula

$$R^1(Y^1COX^1)_2 \qquad \text{(VII)}$$

wherein each R^1 is independently a divalent aliphatic, alicyclic or aromatic radical, each Y^1 is independently oxygen or sulur

and X_1 is chlorine or bromine, with (2) at least one compound of the formula

$$(HY^1)_2A^1—Y^2—A^2(Y^1H)_2, \quad \text{(VIII)}$$

wherein each of A_1 and A^2 is a trivalent aromatic radical and Y^2 is a bridging radical in which one or two atoms separate A^1 from A^2;

with or without (3) at least one bis(active hydrogen) compound having the formula

$$R^3(Y^3H)_2, \quad \text{(IX)}$$

wherein each Y^3 is independently sulfur when the corresponding R^3 is aliphatic or alicyclic and oxygen or sulfur when the corresponding R^3 is aromatic; with

(B) at least one oleophilic aliphatic or heterocyclic tertiary amine and

(C) an aqueous alkali metal hydroxide solution having a concentration of about 0.1–10 M;

said contact being effected under conditions resulting in high dilution of (A), or the equivalent thereof, in a substantially non-polar organic liquid which forms a two-phase system with water, for a period of time sufficient to form said polycyclic oligomers; and recovering said oligomers.

4,888,412

TANNING ASSISTANT

Klaus Ebel, Mutterstadt; Wolfgang Reuther, Heidelberg; Rolf Fikentscher, Ludwigshafen; Dietrich Lach, Friedelsheim; Rolf Streicher, Worms, and Ortwin Schaffer, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 28, 1988, Ser. No. 225,366

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724868

Int. Cl.[4] C09G *12/10*

U.S. Cl. 528—230 **4 Claims**

1. A condensation product of melamine, glyoxylic acid and glyoxal for use as a tanning assistant, obtained by condensing 1 mole of melamine with from 1 to 5 moles of glyoxylic acid or an alkali metal salt thereof and with from 1 to 5 moles of glyoxal, the total number of moles of glyoxylic acid or alkali metal salt thereof and glyoxal being from 5 to 7, in aqueous solution at from 20° to 100° C., by first converting the total amount of glyoxylic acid or alkali metal salt thereof and then converting the glyoxal under the same conditions.

4,888,413

POLY(PROPYLENE GLYCOL FUMARATE) COMPOSITIONS FOR BIOMEDICAL APPLICATIONS

Abraham J. Domb, 6410 Elray Dr., Baltimore, Md. 21209

Filed Jan. 11, 1988, Ser. No. 142,471

Int. Cl.[4] C08G *63/02*

U.S. Cl. 528—272 **36 Claims**

1. A biodegradable, biocompatible polymeric composition useful for repair of bone or tissue comprising:

polymers of fumaric acid and propylene glycol having a preferred weight average molecular weight (Mw) of between about 500 and 3000 and a number average molecular weight (Mn) of between about 300 and 2000, and between 1 and 2 mmole carboxylic acid end groups per gram of polymer.

4,888,414

INSULIN-BINDING PEPTIDES AND USES THEREOF

Victoria P. Knutson, Pearland, Tex., assignor to Board of Regents, University of Texas System, Austin, Tex.

Filed Apr. 9, 1987, Ser. No. 36,215

Int. Cl.[4] C07K *7/40, 7/06;* **A61K** *35/39*

U.S. Cl. 530—303 **2 Claims**

1. A peptide having the formula Y-Cys-Val-Glu-Glu-Ala-Ser-X; wherein each of X and Y is independently selected from the group consisting of a terminal amino group and a terminal carboxyl group.

4,888,415

GELONIN IMMUNOTOXIN

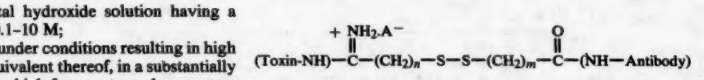
John M. Lambert; Walter A. Blättler, both of Brookline, and Peter D. Senter, Boston, all of Mass., assignors to Dana-Farber Cancer Institute, Inc., Boston, Mass.

Continuation of Ser. No. 707,650, Mar. 4, 1985, abandoned. This application Mar. 7, 1988, Ser. No. 166,777

Int. Cl.[4] A61K *39/44;* **C07G** *7/00*

U.S. Cl. 530—390 **10 Claims**

1. An immunotoxin having the structure



wherein Toxin-NH is gelonin, n is an integer from 1 to 5, m is an integer from 1 to 5, NH-Antibody is a monoclonal antibody specific to eucaryotic cells or to antigens associated therewith, and A^- is a non-toxic water-soluble anion.

4,888,416

METHOD FOR STABILIZING SOMATOTROPINS

Alvin M. Janski, Northbrook, and Susan M. Drengler, Lindenhurst, both of Ill., assignors to International Minerals & Chemical Corp., Northbrook, Ill.

Filed Mar. 30, 1987, Ser. No. 31,273

Int. Cl.[4] C07K *3/28*

U.S. Cl. 530—399 **36 Claims**

1. A method for preparing a dried natural or recombinant animal somatotropin product which comprises:

(a) forming an aqueous solution comprising a mixture of a somatotropin and an ionic detergent which can bind strongly to the somatotropin, wherein the amount of the detergent is sufficient to substantially coat the somatotropin, and

(b) drying the somatotropin-detergent mixture wherein the bioactivity and potential for solubility of the somatotropin are substantially maintained when the dried somatotropin-detergent mixture is contacted with an aqueous fluid.

4,888,417

THERAPEUTIC AND PROPHYLACTIC AGENTS FOR PEPTIC ULCER

Yusei Shiraga, Hyogo; Chikara Fukaya; Toshiaki Akira, both of Osaka; Masakazu Iwai; Kazumasa Yokoyama, both of Osaka; Mamoru Tabata, Kyoto; Hiroshi Fukui, Shiga; Shigeo Tanaka, Kyoto; Yoshiro Iga, Osaka; Tadakazu Suyama, Kyoto, and Kanemichi Okano, Osaka, all of Japan, assignors to Green Cross Corporation, Osaka, Japan

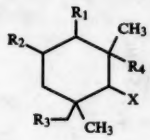
Filed May 27, 1986, Ser. No. 867,169

Claims priority, application Japan, May 25, 1985, 60-112836; May 25, 1985, 60-112837; May 25, 1985, 60-112838; Oct. 21, 1985, 60-234739

Int. Cl.[4] A61K *31/70*

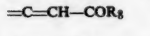
U.S. Cl. 536—4.1 **9 Claims**

1. A therapeutic and prophylactic agent for peptic ulcer which comprises as an active ingredient, in substantially pure isolated form, at least one member selected from the group consisting of a compound of the general formula (I):

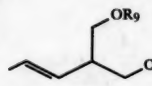

(I)

wherein R_1 represents hydrogen or =O; R_2 represents hydrogen or —OR_5; R_3 represents hydrogen or —OR_6; R_4 represents —OR_7 in the case of the absence of double bond; R_5, R_6 and R_7 each represents hydrogen or an organic residue;

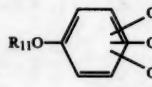
X represents group (A):


(A)

or group (B):


(B)

wherein R_8 represents alkyl, and R_9 and R_{10} each represents hydrogen or an organic residue; with the proviso that when X represents group (A), then R_1 and R_3 both represent hydrogen, R_2 represents —OR_5, R_4 represents OR_7 and the bond between the carbon atom to which X is attached and the carbon atom to which R_4 is attached is a single bond, and when X represents group (B), then R_1 represents =O, R_2 represents hydrogen, R_3 represents —OR_6 and the bond between the carbon atom to which X is attached and the carbon atom to which R_4 is attached is a double bond, or a pharmaceutically acceptable salt thereof; and a compound of the general formula (II):


(II)

wherein R_{11} represents hydrogen or an organic residue, and R_{12}, R_{13} and R_{14} each represents an organic residue; or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier, wherein each of said organic residues for R_5, R_6, R_9 and R_{10} independently represents straight-chain or branched-chain alkyl of 1 to 6 carbon atoms, aliphatic or aromatic acyl of 1 to 6 carbon atoms, alkoxycarbonyl having a straight-chain alkoxy moiety of 1 to 6 carbon atoms and a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkylcarbonyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, cyclic acetal or an oligosaccharide residue of 1 to 3 saccharide units in which the hydroxyl groups are substituted or unsubstituted, and wherein the organic residue for R_{11} represents straight-chain or branched-chain alkyl of 1 to 6 carbon atoms, aliphatic or aromatic acyl of 1 to 6 carbon atoms, alkoxycarbonyl having a straight-chain or branched-chain alkoxy moiety of 1 to 6 carbon atoms, alkoxycarbonylalkyl having a straight-chain or branched-chain alkoxy moiety of 1 to 6 carbon atoms and a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkylcarbonyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms or an oligosaccharide residue of 1 to 3 saccharide units in which the hydroxyl groups are substituted or unsubstituted, and wherein each of said organic residues for R_{12}, R_{13} and R_{14} independently represents straight-chain or branched-chain alkyl of 1 to 6 carbon atoms, alkoxycarbonyl having a straight-chain or branched-chain alkoxy moiety of 1 to 6 carbon atoms, alkoxycarbonylalkyl having a straight-chain or branched-chain alkoxy moiety of 1 to 6 carbon atoms and a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkylcarbonyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, aliphatic or aromatic acyl of 1 to 6 carbon atoms, alkoxycarbonyl having a straight-chain or branched-chain alkoxy moiety of 1 to 6 carbon atoms, alkoxycarbonylalkyl having a straight-chain or branched-chain alkoxy moiety of 1 to 6 carbon atoms and a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms, carboxyalkylcarbonyl having a straight-chain or branched-chain alkyl moiety of 1 to 6 carbon atoms or cyclic acetal.

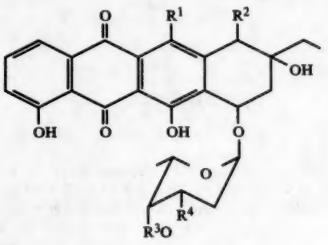
4,888,418

DERIVATIVES OF 13-DEOXYCARMINOMYCIN

Hiroyuki Kawai; Shohachi Nakajima, both of Maebashi, and Tomio Takeuchi, Tokyo, all of Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 166,707
Claims priority, application Japan, Mar. 14, 1987, 62-59286
Int. Cl.[4] C07H *15/24*
U.S. Cl. 536—6.4 **2 Claims**

1. An anthracycline compound useful as an antitumor agent selected from the group consisting of anthracycline compounds represented by the following general formula


[A]

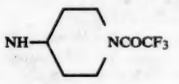
wherein

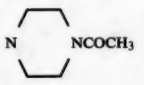
(i) R^1 is a hydroxyl group

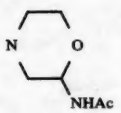
(ii) R^2 represents a hydrogen atom or a hydroxyl group

(iii) R^3 is a hydrogen atom

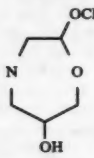
(iv) R^4 represents one of the following groups (a) to (d)

(a)


(b)


(c)

(R)

-continued



(d)

and if R^2 is OH, R^4 is not (d).

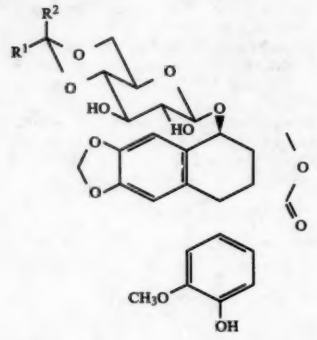
4,888,419

3'-DEMETHOXYEPIPODOPHYLLOTOXIN GLUCOSIDE DERIVATIVES

Mark G. Saulnier, Middletown, and Dolatrai M. Vyas, Madison, both of Conn., assignors to Bristol-Myers Company, New York, N.Y.

Filed Aug. 31, 1987, Ser. No. 91,570
Int. Cl.[4] C07H *15/26*; A61K *31/70*
U.S. Cl. 536—18.1 **4 Claims**

1. A compound having the formula



wherein R^2 is hydrogen and R^1 is selected from the group consisting of C_1–C_{10} alkyl, C_2–C_{10} alkenyl, C_3–C_7 cycloalkyl, furyl, thienyl, C_6–C_{10} aryl, and C_7–C_{14} aralkyl, said aryl and aralkyl rings being unsubstituted or substituted with one or more substituents selected from the group consisting of halo, C_1–C_4 alkyl, nitro, hydroxy, C_1–C_4 alkoxy; or R^1 and R^2 are each C_1–C_{10} alkyl; or R^1 and R^2 and the carbon atom to which they are attached join to form a C_5–C_6 cycloalkyl group.

4,888,420

WATER SOLUBLE CELLULOSE ACETATE MICROSPHERES

Thomas L. Steiner, Charlotte, N.C.; Dana T. Minnick, University Heights, Ohio; Kenneth A. Domeshek, Matthews, and Donald H. Lester, Jr., Pineville, both of N.C., assignors to Celanese Fibers, Inc., New York, N.Y.

Filed Dec. 8, 1987, Ser. No. 130,345
Int. Cl.[4] C08B *15/10, 16/00, 3/06*
U.S. Cl. 536—64 **8 Claims**

1. A microparticle of cellulose ester comprising a particle, ranging in size from less than one micron to about 1000 microns, being made of a water soluble cellulose acetate or a derivative thereof, said water soluble cellulose acetate having a degree of substitution ranging from about 0.5 to about 1.0.

8. A microparticle of cellulose ester comprising a particle, ranging in size from less than one micron to about 1000 microns, being made of a water soluble cellulose acetate or a derivative thereof, said water soluble cellulose acetate having a degree of substitution ranging from about 0.5 to about 0.1, having an interior void space, said space

having a diameter greater than about 50% of said particle size, and having a plurality of exterior pores, said pores ranging in size from about 0.1 micron to about 0.3 microns.

4,888,421

PROCESS FOR MAKING COMPOUNDS CONTAINING CHELATED METAL IONS AND RESULTANT PRODUCTS WHICH ARE USEFUL FOR AGRICULTURAL, INDUSTRIAL, ENVIRONMENTAL, AND CONSTRUCTION PURPOSES

Brooks M. Whitehurst; Garnett B. Whitehurst, both of 1983 Hoods Creek Dr., New Bern, N.C. 28560, and Donald F. Clemens, 1701 Sulgrave Rd., Greenville, N.C. 27834

Filed Sep. 18, 1987, Ser. No. 98,317
Int. Cl.[4] C07H *23/00*
U.S. Cl. 536—121 **18 Claims**

1. A method of producing chelated metal from ions of a metal selected from the group consisting of: manganese II, iron III, iron II, copper II, zinc II, calcium, and magnesium II, which comprises contacting said metal ions with a heptonate chelating agent containing about 10–14% by weight of fructose, mixing said chelating agent and said metal ions and raising the pH of the resulting mixture to an alkaline pH.

4,888,422

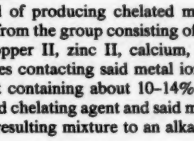
PROCESS FOR PRODUCING DIMETHYLAMINOMETHYL COPPER PHTHALOCYANINE AND/OR ITS DERIVATIVES

Toshio Takei, Hasaki, and Toshio Tanaka, Omigawa, both of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 126,350, Nov. 30, 1987, Pat. No. 4,810,297, which is a continuation-in-part of Ser. No. 936,765, Dec. 2, 1986, abandoned. This application Dec. 5, 1988, Ser. No. 279,796
Claims priority, application Japan, Dec. 10, 1985, 60-275974
Int. Cl.[4] C09B *67/50*
U.S. Cl. 540—135 **5 Claims**

1. A process for producing dimethylaminomethyl copper phthalocyanine and/or its derivative represented by the general formula

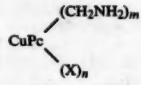
(I)



wherein CuPc represents a copper phthalocyanine residue, X represents a hydrogen atom, a halogen atom, the group $-SO_3H$ or the group $-CH_2OH$, and m and n independently represent an integer of 1 to 4,

and containing only slight amounts of by-products, which

comprises reacting aminomethyl copper phthalocyanine and-/or its derivative represented by the general formula



(II)

wherein CuPc, X, m and n are as defined above, with formic acid and a formaldehyde-generating substance at a temperature of 130° to 150° C. under a pressure of 3 to 10 kg/cm² (gauge).

4,888,423

6-(4-HYDROXYPHENYL)-4,5-DIHYDRO-3(2H)-PYRIDAZINONES AND STABILIZED COMPOSITIONS

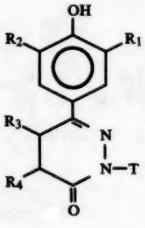
Paul A. Odorisio, Edgewater, N.J., and Steven D. Pastor, Yonkers, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 6, 1986, Ser. No. 915,446

Int. Cl.⁴ C07D *237/14, 403/12, 401/04, 403/14*

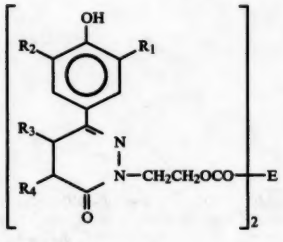
U.S. Cl. 544—238 **7 Claims**

1. A compound of formula Ia or Ib



(Ia)

or



(Ib)

wherein

R_1 and R_2 are each tert-butyl,

R_3 and R_4 are each hydrogen,

T is hydrogen, phenyl, 2-hydroxyethyl or 2-bromoethyl, and

E is alkylene of 4 to 8 carbon atoms.

4,888,424

ACE-DIURETICS

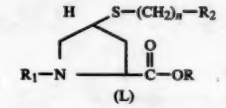
Joseph E. Sundeen, Yardley, Pa.; David Floyd, Pennington, and Ving G. Lee, Plainsboro, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 27, 1984, Ser. No. 583,902

Int. Cl.⁴ C07D *403/12*

U.S. Cl. 544—288 **15 Claims**

1. A compound having the formula

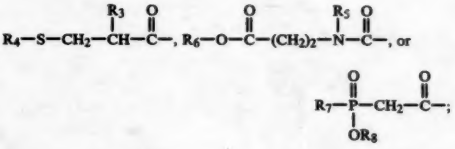


(L)

or a pharmaceutically acceptable salt thereof, wherein

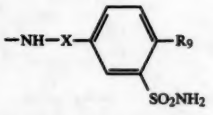
R and R_6 are each independently hydrogen, alkyl, phenylmethyl or diphenylmethyl;

R_1 is

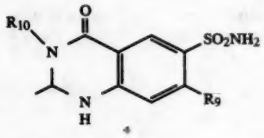


OR_8

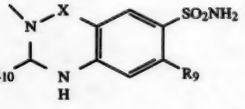
R_2 is



and n is 2, 3, 4 or 5, R_2 is



and n is 1, 2, 3 or 4, or R_2 is

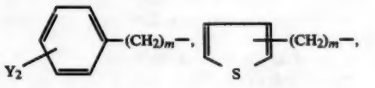


and and n is 2, 3, 4 or 5, wherein X is carbonyl or sulfonyl, R_9 is chlorine, bromine or trifluoromethyl and R_{10} is hydrogen, alkyl or aryl;

R_3 is hydrogen or alkyl;

R_4 is hydrogen or

wherein Y_1 is alkyl,



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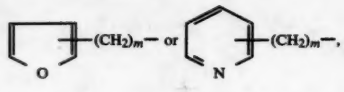
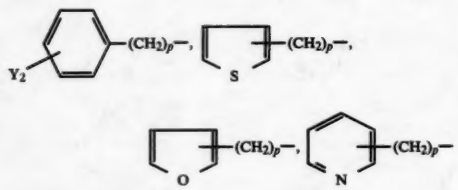


is hydrogen, alkyl, alkoxy, halogen or hydroxy, and m is 0, 1, 2, 3 or 4;

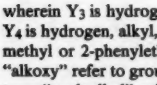
R_5 is alkyl or cycloalkyl;

R_7 is alkyl of 1 to 10 carbon atoms,



or cycloalkyl-$(CH_2)_p$-, wherein p is 0, 1, 2, 3, 4, 5, 6 or 7 and Y_2 is as defined above; and

R_8 is hydrogen, alkyl, phenylmethyl, diphenylmethyl or



wherein Y_3 is hydrogen, alkyl, cycloalkyl or phenyl, and Y_4 is hydrogen, alkyl, alkoxy, cycloalkyl, phenyl, phenylmethyl or 2-phenylethyl; wherein the terms "alkyl" and "alkoxy" refer to groups having up to 7 carbon atoms; the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms; and the term "aryl" refers to phenyl and phenyl substituted with 1, 2 or 3 alkyl, alkoxy or halogen atoms.

4,888,425

PREPARATION OF POLYALKYLENE POLYAMINES

William B. Herdle, Greenburgh, N.Y., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 373,726, Apr. 30, 1982. This application Feb. 7, 1984, Ser. No. 576,807

Int. Cl.[4] C07D *295/12*

U.S. Cl. 544—402 **19 Claims**

1. A process for producing predominantly linearly extended polyalkylene polyamines comprising:

(a) contacting (i) an alkylenediamine with; (ii) a difunctional hydroxy alkylene compound selected from the group consisting of alkylene glycols and alkanolamines; (iii) in the presence of a catalytically effective amount of760 catalyst which is a phosphorus acid or acid derivative compound;

(b) removing water during the reaction; and

(c) recovering the polyalkylene polyamines.

4,888,426

1-(5-METHYL-FURAN-2-YLMETHYL)-N-(4-PIPERIDINYL)IMIDAZO [4,5-6]PYRIDINE-2-AMINE

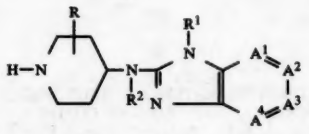
Frans E. Janssens, Bonheiden; Joseph L. G. Torremans, Beerse, and Jozef F. Hens, Nijlen, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Division of Ser. No. 660,608, Oct. 12, 1984, Pat. No. 4,695,569, which is a continuation-in-part of Ser. No. 556,742, Nov. 30, 1983, abandoned. This application Jun. 1, 1987, Ser. No. 56,200 The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.[4] C07D *471/04*

U.S. Cl. 546—118 **1 Claim**

1. A piperidine of the following formula (III-a):



(III-a)

wherein

$A^1{=}A^2{-}A^3{=}A^4$ is N═CH—CH═CH,

R is hydrogen,

R^1 is 5-methyl-2-furanylmethyl, and

R^2 is hydrogen.

4,888,427

AMINO ACIDS CONTAINING DIHYDROPYRIDINE RING SYSTEMS FOR SITE-SPECIFIC DELIVERY OF PEPTIDES TO THE BRAIN

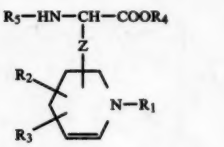
Nicholas S. Bodor, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.

Filed Apr. 7, 1987, Ser. No. 35,648

Int. Cl.[4] C07D *211/86*

U.S. Cl. 546—316 **20 Claims**

1. A compound of the formula



(I)

or a non-toxic pharmaceutically acceptable salt thereof, wherein Z is either a direct bond or C_1–C_6 alkylene and can be attached to the heterocyclic ring via a ring carbon atom or via the ring nitrogen atom; R_1 is C_1–C_7 alkyl, C_1–C_7 haloalkyl or C_7–C_{12} aralkyl when Z is attached to a ring carbon atom; R_1 is a direct bond when Z is attached to the ring nitrogen atom; R_2 and R_3, which can be the same or different, are selected from the group consisting of hydrogen, halo, cyano, C_1–C_7 alkyl, C_1–C_7 alkoxy, C_2–C_8 alkoxycarbonyl, C_2–C_8 alkanoyloxy, C_1–C_7 haloalkyl, C_1–C_7 alkylthio, C_1–C_7 alkylsulfinyl, C_1–C_7 alkylsulfonyl, —CH═NOR‴ wherein R‴ is hydrogen or C_1–C_7 alkyl, and —CONR′R″ wherein R′ and R″, which can be the same or different, are each hydrogen or C_1–C_7 alkyl; R_4 is hydrogen or a carboxyl protective group and R_5 is hydrogen or an amino protective group, said carboxyl protective group and said amino protective group being designed to protect the carboxyl and amino functions during synthesis or to improve lipoidal characteristics and prevent premature metabolism of said functions in vivo; and the dotted lines indicate that the compound of formula (I) contains a 1,4- or 1,6-dihydropyridine ring system.

4,888,428
BENZOTHIAZOLONES, AND THEIR PRODUCTION AND USE

Toru Haga, Takarazuka; Eiki Nagano, Nishinomiya; Ryo Sato, and Kouichi Morita, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

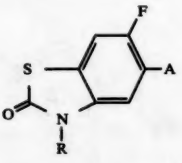
Filed Oct. 21, 1987, Ser. No. 110,882

Claims priority, application Japan, Sep. 27, 1985, 60-216043; Dec. 5, 1985, 60-274113; Dec. 5, 1985, 60-274114; Dec. 5, 1985, 60-274115; Jan. 6, 1986, 61-1171

Int. Cl.[4] C07D *277/68*

U.S. Cl. 548—165 3 Claims

1. A compound of the formula:



wherein R is a hydrogen atom, a C_1–C_5 alkyl group, a C_3–C_4 alkenyl group, a C_3–C_4 alkynyl group, a halo(C_1–C_4)alkyl group, a halo(C_3–C_4)alkenyl group, a halo(C_3–C_4)alkynyl group, a C_1–C_2 alkoxy(C_1–C_2)alkyl group, a C_1–C_2 alkoxy(C_1–C_2)alkoxy(C_1–C_2)alkyl group, a cinnamyl group, a cyano(C_1–C_3)alkyl group, a carboxy(C_1–C_3)alkyl group, a C_1–C_5 alkoxycarbonyl(C_1–C_3)alkyl, group, a halo(C_1–C_5)alkoxycarbonyl(C_1–C_3)alkyl group, a C_1–C_2 alkoxy(C_1–C_2)alkoxycarbonyl(C_1–C_3)alkyl group, a C_1–C_5 alkoxycarbonyl (C_1–C_2)alkoxycarbonyl(C_1–C_3)alkyl group, a cyclo(C_3–C_6)alkoxycarbonyl(C_1–C_3)alkyl group, a C_1–C_5 alkylaminocarbonyl(C_1–C_3)alkyl group or a di(C_1–C_5)alkylaminocarbonyl(C_1–C_3)alkyl group and A is an amino group or a nitro group.

4,888,429
PROCESS FOR PRODUCING ALLYL AMINOTHIAZOLE ACETATE INTERMEDIATES

Paul Hebeisen, Reinach, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

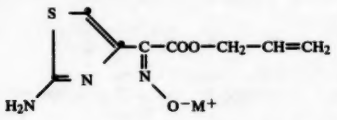
Continuation of Ser. No. 807,702, Dec. 11, 1985, abandoned. This application Oct. 17, 1988, Ser. No. 258,062

Claims priority, application Switzerland, Dec. 19, 1984, 6008/84

Int. Cl.[4] C07D *277/40*

U.S. Cl. 548—194 6 Claims

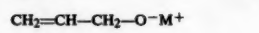
1. A process for producing a compound of the formula



I

wherein M is an alkali metal atom, which process comprises:

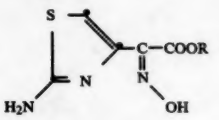
(a) reacting allyl alcohol with at least about one molar equivalent of a base selected form the group consisting of alkali metal, alkali metal hydride, alkali metal alkyl, and alkali metal hydroxide to form a corresponding allyl alcohol salt of the formula



III

wherein M has the above significance; and

(b) reacting about one to about two molar equivalents of a compound of the formula



II

whein R is lower alkyl,

with compound III under anhydrous conditions and in excess allyl alcohol thereby to produce compound I.

4,888,430
FLOURINE-CONTAINING 5-TRIHALOGENOMETHYL-ISOXAZOLES AND A PROCESS FOR THEIR PREPARATION

Bernd Baasner, Leverkusen; Alexander Klausener, Stolberg, and Pieter Ooms, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

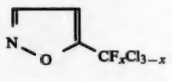
Filed Nov. 25, 1987, Ser. No. 125,296

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1986, 3642453

Int. Cl.[4] C07D *261/08*

U.S. Cl. 548—247 2 Claims

1. A 5-trihalogenomethyl-isoxazole of the formula



in which

x represents 1,2, or 3.

4,888,431
PROCESS FOR THE PREPARATION OF SUBSTITUTED FUSED TETRAHYDROCARBAZOLE ACETIC ACID DERIVATIVES

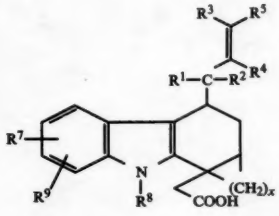
Dominick Mobilio, Franklin Park, N.J., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 230,101, Aug. 9, 1988, which is a division of Ser. No. 184,468, Apr. 21, 1988, Pat. No. 4,783,479. This application Jun. 15, 1989, Ser. No. 366,560

Int. Cl.[4] C07D *209/80*

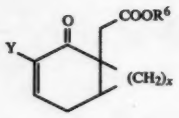
U.S. Cl. 548—420 3 Claims

1. Process for the production of the compound of structure (I)



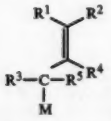
(I)

wherein R^1, R^2, R^3, R^4 and R^5 are hydrogen or lower alkyl; R^7 is hydrogen, lower alkyl, or halogen; R^8 is hydrogen or lower alkyl; R^9 is hydrogen, lower alkyl, halogen, or acetyl which comprises reacting the compound of structure (IV)

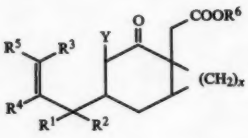


(IV)

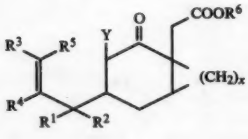
wherein R^6 is lower alkyl, Y is bromine or chlorine, and x is 1 to 5 with



wherein R^1, R^2, R^3, R^4 and R^5 are as defined above and M is $SiR^{10}R^{11}R^{12}$ or $SnR^{10}R^{11}R^{12}$ wherein R^{10}, R^{11} and R^{12} are independently selected from the group consisting of hydrogen, straight chain or branched lower alkyl containing 1 to 6 carbon atoms, cycloalkyl, aryl, arylalkyl, halogen, and alkoxy, with the reaction being carried out in the presence of an acid to obtain a compound or compounds of structure (Va), or (Vc)

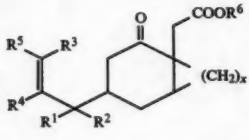


(Va)

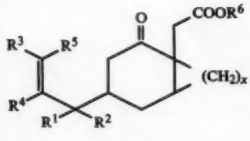


(Vc)

wherein R^1, R^2, R^3, R^4, R^5, R^6, Y and x are as defined above and reducing a compound of structure (Va) or (Vc) to produce a compound of structure (Vb) or (Vd)

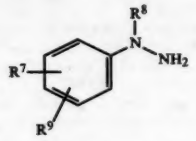


(Vb)



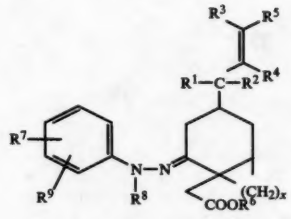
(Vd)

wherein R^1, R^2, R^3, R^4, R^5, R^6 and x are as defined above, and further reacting a compound of structure (Vb) or (Vd) with the substituted hydrazine of formula (VI)



(VI)

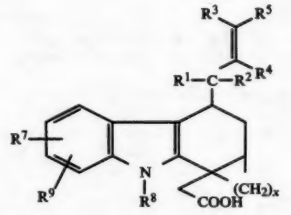
wherein R^7 and R^8 are as defined above, and R^9 is hydrogen, halogen or lower alkyl containing 1 to 6 carbon atoms, to obtain the corresponding hydrazone of structure (VII)



(VII)

wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8 and x are as defined above, R^9 is hydrogen, halogen or lower alkyl containing 1 to 6 carbon atoms and treating the hydrazone with a cyclizing agent to give the ester of compound (I); and further hydrolyzing said ester to obtain the compound (I) wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8 and x are as defined above, R^9 is hydrogen, halogen or lower alkyl containing 1 to 6 carbon atoms, or acetyl.

3. Process for the production of the compound of structure (I)

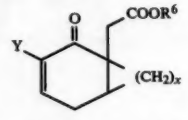


(I)

wherein R^4 and R^5 are joined together to form

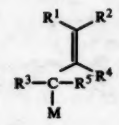
$$-CH=CH-CH=CH-,$$

R^1, R^2 and R^3 are independently hydrogen or lower alkyl; R^7 is hydrogen, lower alkyl, or halogen; R^8 is hydrogen or lower alkyl; R^9 is hydrogen, lower alkyl, halogen, or acetyl which comprises reacting the compound of structure (IV)

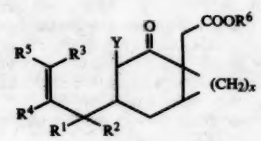


(IV)

wherein R^6 is lower alkyl, Y is chlorine or bromine, and x is 1 to 5 is reacted with

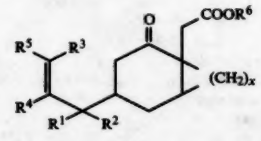


wherein R^1, R^2, R^3, R^4, R^5 and x are as defined above, and M is MgBr, MgCl, or MgI, carrying out the reaction in the presence of a suitable copper catalyst to obtain a compound of structure (Va)



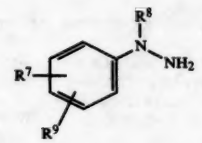
(Va)

wherein R^1, R^2, R^3, R^4, R^5, R^6, Y and x are as defined above and further reducing a compound of structure (Va) to produce a compound of structure (Vb)



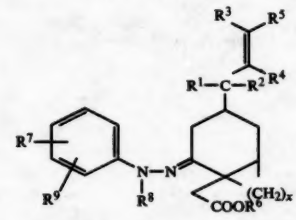
(Vb)

wherein R^1, R^2, R^3, R^4, R^5, R^6 and x are as defined above, and further reacting a compound of structure (Vb) with the substituted hydrazine of formula (VI)



(VI)

wherein R^7 and R^8 are as defined above, and R^9 is hydrogen, halogen or lower alkyl containing 1 to 6 carbon atoms, to obtain the corresponding hydrazone of structure (VII)



(VII)

wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8 and x are as defined above and R^9 is hydrogen, halogen or lower alkyl containing 1 to 6 carbon atoms; and treating the hydrazone (VII) with a cyclizing agent to give the ester of compound (I); and further hydrolyzing said ester to obtain the compound (I) wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8 and x are as defined above, R^9 is hydrogen, halogen or lower alkyl containing 1 to 6 carbon atoms, or acetyl.

4,888,432

PROCESS FOR PREPARING 2-AMINO-THIOPHENES AND AZO DYESTUFFS PREPARED THEREFROM

Rainer Hamprecht, Odenthal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

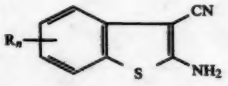
Filed Oct. 15, 1987, Ser. No. 109,022

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1986, 3637223

Int. Cl.[4] C07C *153/00, 153/063;* C07D *333/00, 333/68*

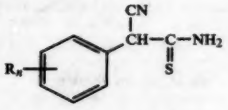
U.S. Cl. 549—57 8 Claims

1. A process for preparing a 2-aminothiophene of the formula



in which

R denotes a substituent selected from the group consisting of F, Cl, Br, I, C_1–C_4-alkyl, NO_2, CN, SO_2-C_1–C_4-alkyl and CF_3 and n is a number from 0 to 4, comprising reacting a thioamide of the formula



in which

R and n have the abovementioned meanings, with a dehydrogenating agent at a temperature of −20° C. to 100° C. in the presence of an inert solvent to form a thiophene ring.

4,888,433

PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE ALPHA-ARYLALKANOIC ACIDS AND NOVEL INTERMEDIATES THEREOF

Claudio Giordano, Vicenza; Graziano Castaldi, Briona; Fulvio Uggeri, Codogno, and Silvia Cavicchioli, Costermano, all of Italy, assignors to Zambon, S.p.A., Vicenza, Italy

Continuation of Ser. No. 720,380, Apr. 5, 1985, Pat. No. 4,697,036. This application Aug. 5, 1987, Ser. No. 82,196

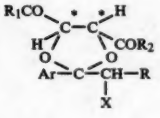
Claims priority, application Italy, Apr. 6, 1984, 7204 A/84; Aug. 6, 1984, 7206 A/84; Aug. 6, 1984, 7207 A/84

The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.

Int. Cl.[4] C07D *317/16, 317/24, 317/20*

U.S. Cl. 549—450 5 Claims

1. An optically active alpha-halogen-ketal having the formula:



(A)

wherein

Ar represents phenyl, diphenyl or naphthyl, unsubstituted or substituted by halogen, C_1–C_6 alkyl, C_3–C_6 cycloalkyl, benzyl, hydroxy, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 haloalkyl, C_1–C_4 haloalkoxy, phenoxy, thienylcarbonyl or benzoyl;

R represents linear or branch C_1–C_4 alkyl;

R_1 and R_2, each independently, represent hydroxy, O^-M^+, OR_3 or NR_4R_5,

R_3 represents C_1–C_{24} alkyl, C_3–C_6 cycloalkyl, phenyl or benzyl,

M is the cation of an alkaline metal,

R_4 and R_5, each independently, represent hydrogen, C_1–C_4 alkyl, C_5–C_6 cycloalkyl or $-(CH_2)_n-CH_2OH$ wherein n is 1, 2 or 3, or R_4 and R_5 together constitute a $-(CH_2)_m-$ group wherein m is 4 or 5, or $-CH_2-CH_2-R_7-CH_2-CH_2-$ group wherein R_7 is oxygen, NH or $N(C_1-C_4)$ alkyl, and

X represents hydrogen, chlorine, bromine or iodine,

the carbon atoms indicated by an asterisk having both (R) or (S) configuration.

4,888,434

ANTIMICROBIAL AGENT

Fujio Sawaragi, Chigasaki, and Hiroo Taniguchi, Hadano, both of Japan, assignors to Dow Corning K.K., Tokyo, Japan

Filed May 23, 1988, Ser. No. 197,778

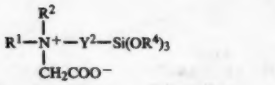
Claims priority, application Japan, May 26, 1987, 62-127057

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

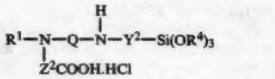
Int. Cl.[4] C07F 7/10

U.S. Cl. 556—418 **11 Claims**

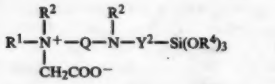
1. An antimicrobial agent wherein the compound is selected from the group consisting of compounds of the following formulas:



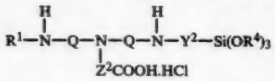
(1)



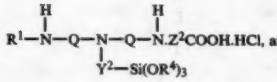
(2)



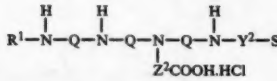
(3)



(4)



(5)



(6)

where Q is an alkylene group of 1 to 7 carbon atoms or the phenylene group; Y^2 is a divalent hydrocarbon radical of 1 to 8 carbon atoms or a radical of 1 to 8 carbon atoms which includes —COO— or —O— radicals; Z^2 is an alkylene radical; R^1 is a hydrophobic monovalent hydrocarbon group and R^4 is an alkyl or acyl group.

4,888,435

INTEGRATED PROCESS FOR ALKYLATION AND REDISTRIBUTION OF HALOSILANES

Kirk M. Chadwick, Hanover; Roland L. Halm, Madison, both of Ind., and Brian R. Keyes, Salt Lake City, Utah, assignors to Dow Corning Corporation, Midland, Mich.

Filed Jun. 22, 1989, Ser. No. 370,209

Int. Cl.[4] C07F 7/08, 7/12

U.S. Cl. 556—469 **28 Claims**

1. A process for preparing multi-organic substituted silanes having the formula,

$$R_aR^i_bSiX_{(4-a-b)},$$

where each R is independently selected from the group consisting of methyl, ethyl, and n-propyl; each R^i is independently selected from a group consisting of alkyl, substituted alkyl, alkenyl, aryl, and alkaryl groups; a has a value of 1, 2, 3, or 4, b has a value of 0, 1, 2, or 3 and the sum of a+b is 2, 3, or 4; and X is a halogen atom, the process comprising

(A) contacting a halide of silicon, having the formula,

$$R^i_bSiX_{(4-b)},$$

where R^i, b, and X are defined above; with an alkyl halide, having the formula,

RX;

where R and X are defined above, in the presence of a metal which serves as a halogen acceptor;

(B) reacting the halide of silicon with the alkyl halide in the presence of the metal at a temperature greater than 200° C. to form an initial reaction mixture; and

(C) contacting the initial reaction mixture with a redistribution catalyst;

(D) isolating and separating the multi-organic substituted silane.

4,888,436

PROCESS FOR PREPARING AMINOPROPYL ALKOXY SILANES

Kouji Shiozawa, Saitama; Haruko Takai, Chiba; Kazutoshi Takatsuna; Nobukazu Okamoto, both of Saitama; Yoshiharu Okumura, Tokyo, and Chihiro Imai, Kanagawa, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

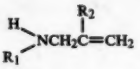
Filed Mar. 28, 1988, Ser. No. 174,493

Claims priority, application Japan, Mar. 27, 1987, 62-73489; May 15, 1987, 62-1181138; Aug. 11, 1987, 62-200234; Dec. 16, 1987, 62-318402

Int. Cl.[4] C07F 7/10

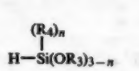
U.S. Cl. 556—413 **7 Claims**

1. A process for preparing aminopropyl alkoxy silanes comprising reacting an allylamine of the formula [I]



[I]

wherein R_1 is hydrogen, alkyl having from 1 to 10 carbon atoms, alkenyl having from 2 to 10 carbon atoms, phenyl, substituted phenyl, $-CH_2CH_2NHCH_2CH_2NH_2$ or $-CH_2CH_2NH_2$, and R_2 is hydrogen or alkyl having from 1 to 6 carbon atoms with a hydro-alkoxy silane of the formula [II]



[II]

wherein R_3 and R_4 are the same or different, each represents

alkyl having from 1 to 6 carbon atoms, and n is 0, 1 or 2, in the presence of a rhodium complex having inorganic ligands, at least one of said ligands being carbonyl.

4,888,437

ALKYL HYDROXYALKYL PHOSPHORIC ACID ESTERS

Ulrich Zeidler, Duesseldorf, and Alfred Meffert, Monheim, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

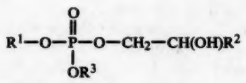
Filed Jul. 2, 1987, Ser. No. 69,788

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1986, 3622440

Int. Cl.[4] C07F 9/09

U.S. Cl. 558—105 18 Claims

1. An alkyl hydroxyalkyl orthophosphoric acid ester having the formula



in which R^1 and R^2 is an alkyl group having from 6 to 22 carbon atoms and R^3 is hydrogen, R^1 or $—CH_2—CH(OH)R^2$.

4,888,438

METHOD FOR AMMOXIDATION OF PARAFFINS AND CATALYST SYSTEM THEREFOR

Linda C. Glaeser, Lyndhurst; James F. Brazdil, Jr., Mayfield Village, and Mark A. Toft, Lakewood, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 222,985, Jul. 22, 1988, which is a continuation-in-part of Ser. No. 39,859, Apr. 20, 1987, Pat. No. 4,767,739. This application Oct. 31, 1988, Ser. No. 264,751

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.[4] C07C 120/14

U.S. Cl. 558—319 19 Claims

1. A process for the ammoxidation of a C_3 to C_5 paraffin to an α,β-unsaturated mononitrile which comprises contacting in a reaction zone said paraffin in the vapor phase in admixture with ammonia, molecular oxygen, and optionally an inert gaseous diluent, with an intimate particulate mixture of a first catalyst composition and a second catalyst composition, said feed to the reaction zone containing a mole ratio of paraffin:NH_3 in the range from 2 to 16 and a mole ratio of paraffin to O_2 in the range from 1 to 10,

said first catalyst composition being 10–99 weight percent of a diluent/support and 90-1 weight percent of a catalyst having the components in the proportions indicated by the empirical formula:

$$VSb_mA_aH_bC_cT_fO_x, \qquad \text{formula (1)}$$

where

A is one or more of W, Sn, Mo, B, P and Ge;

H is one or more of Fe, Co, Ni, Cr, Pb, Mn, Zn, Se, Te, Ga, In and As;

C is one or more of an alkali metal and Tl;

T is one or more of Mg, Ca, Sr and Ba; and

where m is from 0.01 and up to 20; a is 0.2–10; b is 0–20; c is 0–1; t is 0–20; the ratio (a+b+c+t):(1+m) is 0.01–6; wherein x is determined by the oxidation state of other elements, and wherein the antimony has an average valency higher than +3 and the vanadium has an average valency lower than +5,

said second catalyst composition being 0–99 weight percent of a diluent/support and 100–1 weight percent of a catalyst having the components in the proportions indicated by the empirical formula:

$$Bi_kFe_lMo_{12}D_dE_eF_fG_gO_x \qquad \text{formula (2)}$$

where

D is one or more of an alkali metal, Sm, Ag

E is one or more of Mn, Cr, Cu, V, Zn, Cd, La,

F is one or more of P, As, Sb, Te, W, B, Sn, Pb, Se

G is one or more of Co, Ni, alkaline earth metal and

k is 0.1–12, l is 0.01–12, d is 0–0.5, e is 0–10,

f is 0–10, g is 0–12, $k+l+d+e+f+g \leqq 24$, and x is a number determined by the valence requirements of the other elements present, and wherein the weight ratio in said mixture of said first catalyst composition to said second catalyst composition is in the range of 0.001 to 2.5.

4,888,439

POLYPRENYL COMPOUND AND PHARMACEUTICAL USE

Isao Yamatsu; Takeshi Suzuki; Shinya Abe, all of Ibaragi; Kouji Nakamoto, Tsuchiura; Akiharu Kajiwara, Ibaragi; Manabu Murakami, Ibaragi; Kiyoshi Oketani, Ibaragi, and Hideaki Fujisaki, Ibaragi, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

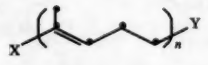
Filed May 1, 1985, Ser. No. 729,444

Claims priority, application Japan, May 9, 1984, 59-90995

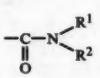
Int. Cl.[4] C07C 101/02, 69/66

U.S. Cl. 560—129 8 Claims

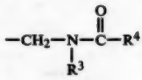
1. A polyprenyl compound having the formula:



wherein X represents (1) a group of the formula:



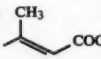
wherein R^1 and R^2, which can be the same or different, each represent hydrogen, lower alkyl, hydroxyalkyl, or lower alkenyl; atom; or (2) a group of the formula:



wherein R^3 represents hydrogen or lower alkyl, and R^4 represents lower alkyl;

Y represents a group of the formula:

or a group of the formula:



wherein R^5 represents hydrogen or lower alkyl, and n represents an integer of from 2 to 5.

4,888,440

PROCESS FOR THE PREPARATION OF ASPARTIC ACID 4-(PHENYLMETHYL) ESTER

Ludwig Wilschowitz, Neuseass, Fed. Rep. of Germany, assignor to Diamalt AG, Munich, Fed. Rep. of Germany

PCT No. PCT/DE88/00183, § 371 Date Nov. 25, 1988, § 102(e) Date Nov. 25, 1988, PCT Pub. No. WO88/07520, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 17, 1988, Ser. No. 279,593

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710192

Int. Cl.[4] C07C *67/08*

U.S. Cl. 560—171 6 Claims

1. A process for preparing aspartic acid 4-(phenylmethyl) ester from aspartic acid and benzyl alcohol, comprising

reacting 10–40 moles of benzyl alcohol and 1–5 moles of acetyl chloride per mole of aspartic acid;

conducting the reaction at a temperature of 31 10° C. to 50° C.; and

separating the thus-formed aspartic acid 4-(phenylmethyl) ester by neutralization with an organic base.

4,888,441

PREPARATION OF LINEAR, LOW-MOLECULAR-WEIGHT POLYESTER-BASED POLYOLS

Leonard J. Calbo, Jr., and Lawrence V. Gallacher, both of Norwalk, Conn., assignors to King Industries, Inc., Norwalk, Conn.

Continuation-in-part of Ser. No. 453,222, Dec. 27, 1982. This application Dec. 21, 1984, Ser. No. 684,737

Int. Cl.[4] C07C *67/03, 67/08*

U.S. Cl. 560—198 4 Claims

1. A process for preparing a linear, low-molecular-weight polyesterbased polyol having, (a) at least two hydroxyl groups, (b) low viscosity, (c) high solids content; comprising heat reacting at least one polyhydric alcohol having from 1 to 6 hydroxyl groups of which at least one is a primary hydroxyl group with at least one aliphatic saturated dicarboxylic acid or a lower alkyl ester thereof in a mole ratio of from about 2.2:1.0 to about 6.0:1.0 respectively until esterification or transesterification is substantially completed. stripping the thus produced product in order to remove any excess of said unreacted polyhydric alcohol by using a product stripping temperature of from about 150° C. to 225° C. at an absolute pressure of from about 0.05 to 200 torr for a period of time from about 10 seconds to 10 minutes whereby the resultant product is substantially free of said polyhydric alcohol, and immediately cooling the resultant product to prevent further chemical reaction.

4,888,442

REDUCTION OF FREE MONOMER IN ISOCYANATE ADDUCTS

Kenneth L. Dunlap, New Martinsville, W. Va.; Peter H. Markusch, McMurray, Pa., and Clarence D. Ferrell, Moundsville, W. Va., assignors to Mobay Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 429,910, Sep. 30, 1982, abandoned. This application Sep. 23, 1986, Ser. No. 910,579

Int. Cl.[4] C07C *119/00*

U.S. Cl. 560—352 14 Claims

1. A process for reducing the free monomer content of a low molecular weight polyisocyanate adduct mixture wherein the polyisocyanate adduct has an average functionality of greater than about 2.5 which comprises

(a) treating said polyisocyanate adduct mixture in an agitated thin-layer evaporator under conditions sufficient to reduce the free monomer content to less than about 2 percent by weight, based on the weight of said polyisocyanate adduct mixture,

(b) adding 2 to about 20 percent by weight of an inert solvent, based on the weight of said polyisocyanate adduct mixture, to said polyisocyanate adduct mixture, and

(c) treating the mixture formed in step (b) in an agitated thin-layer evaporator under conditions sufficient to reduce the free monomer content of said polyisocyanate adduct mixture.

4,888,443

PROCESS FOR THE PRODUCTION OF PIMELIC ACID

Jawad H. Murib, Cincinnati, and John H. Kahn, Wyoming, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Oct. 9, 1984, Ser. No. 659,466

Int. Cl.[4] C07C *51/12, 55/16*

U.S. Cl. 562—517 7 Claims

1. A process for the preparation of pimelic acid, said process comprising reacting ϵ-caprolactone with carbon monoxide and water in the presence of a carbonylation catalyst and a hydrogen halide, the molar ratio of water to ϵ-caprolactone being from about 5:1 to 15:1 to retard formation of polymeric by-products.

4,888,444

SUBSTITUTED HYDROXYLAMINE ESTER STABILIZERS

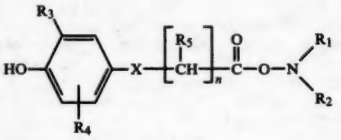
Ramanathan Ravichandran, Yonkers, N.Y., and Stephen D. Pastor, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 26, 1987, Ser. No. 114,992

Int. Cl.[4] C07C *135/00*

U.S. Cl. 564—300 12 Claims

1. A compound of the formula



wherein

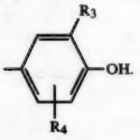
n is 0–2;

X is a direct bond,

R_1 and R_2 independently are hydrogen, alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, allyl, aryl, aralkyl of 7 to 9 carbon atoms, said aralkyl substituted by alkyl of 1 to 36 carbon atoms, or R_1 and R_2 together with the nitrogen atom can form a 5–7 membered heterocyclic ring;

R_3 and R_4 independently are alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, phenyl, alkaryl of 7 to 18 carbon atoms or aralkyl of 7 to 9 carbon atoms; and

R_5 is hydrogen or the group



4,888,445

NEW 2,4-DINITRO- OR 2-AMINO-4-NITRO- OR 2-NITRO-4-AMINO-6-HYDROXYALKYLANILINES, THE PROCESS FOR PREPARATION THEREOF AND THEIR USE IN DYEING KERATINOUS FIBRES, AND ESPECIALLY HUMAN HAIR

Alex Junino, Livry-Gargan; Gerard Lang, Saint-Gratien, and Nicole Jehanno, Brunoy, all of France, assignors to L'Oreal, Paris, France

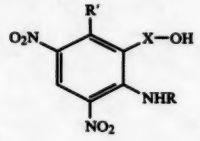
Division of Ser. No. 808,814, Dec. 13, 1985, Pat. No. 4,727,192. This application Nov. 10, 1987, Ser. No. 119,083

Claims priority, application Luxembourg, Dec. 13, 1984, 85.679; Dec. 13, 1984, 85.680; Dec. 13, 1984, 85.681

Int. Cl.[4] C07C *87/52*

U.S. Cl. 564—441 **4 Claims**

1. Process for preparing a 2,4-dinitro-6-hydroxyalkylaniline having the formula (Ia):



(Ia)

wherein:

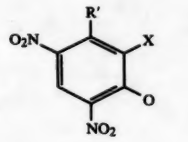
X denotes a branched or unbranched alkylene radical containing 2 to 6 carbon atoms, unsubstituted or substituted with one or more hydroxyl radicals;

R denotes a hydrogen, an alkyl or a mono- or polyhydroxylalkyl radical or an aminoalkyl radical in which the amino group of said aminoalkyl radical may be mono- or disubstituted with an alkyl radical or with a mono- or polyhydroxyalkyl radical, said alkyl radicals containing 1 to 4 carbon atoms; and

R′ denotes a hydrogen atom or C_1 to C_4 alkyl radical;

or the cosmetically acceptable salts of the compounds (Ia) containing a salifiable amine group,

which consists in reacting an aqueous ammonia solution or a primary amine RNH_2, R having the above meaning, with the heterocyclic compound of formula (II):



(II)

in which R′ and X have the above meanings, at a temperature between 20 and 120 degrees C, and at atmospheric or above pressure.

4,888,446

PREPARATION OF POLYOXYALKYLENE GLYCOL AMINES

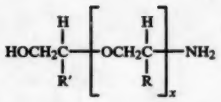
Howard P. Klein, and Michael Cuscurida, both of Austin, Tex., assignors to Texaco Chemical Co., White Plains, N.Y.

Filed Apr. 11, 1988, Ser. No. 179,827

Int. Cl.[4] C07C *85/06*

U.S. Cl. 564—478 **6 Claims**

1. A method for preparing polyoxyalkylene compounds of about 200 to 4000 molecular weight which have a primary amine group and a primary hydroxyl group said compounds having the structure:

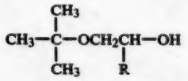


where

R′ is H, $-CH_3$, C_2H_5 and

x is 0-50

comprising reacting a compound of the formula



where R is H, $-CH_3$ or $-CH_2CH_3$ with ethylene oxide, propylene oxide or 1,2-butylene oxide or mixtures thereof, aminating the product of said reaction and then cleaving the t-butyl group of the aminated compound with a halogen acid.

4,888,447

PROCESS FOR PREPARING ALKOXYLATED TERTIARY AMINES

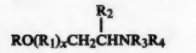
Kim R. Smith, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Jun. 30, 1988, Ser. No. 213,346

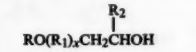
Int. Cl.[4] C07C *85/06, 87/62, 93/06, 87/28*

U.S. Cl. 564—480 **14 Claims**

1. A process for selectively preparing at ambient pressure an alkoxylated tertiary amine having the formula:



or a mixture of such amines which comprises reacting an oxyalkylated alcohol of the formula:



or a mixture of such alcohols, with a secondary amine of the formula HNR_3R_4 at elevated temperature in the presence of a catalytic quantity of an amination catalyst consisting of a combination of Raney nickel and molybdenum wherein R is a straight or branched chain alkyl group having from 1 to 20 carbon atoms, a cyclic alkyl group having from 5 to 10 carbon atoms, an aryl hydrocarbon group having up to 12 carbon atoms, or an aralkyl or alkaryl hydrocarbon group having up to 18 carbon atoms, R_1 is a single unit or a series of units of the formula:

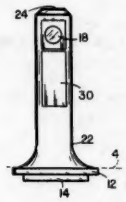
wherein in each unit R_5 is independently selected from the group consisting of hydrogen and a straight or branched chain alkyl group having from 1 to 12 carbon atoms and x is a integer of from 0 to 40, R_2 is hydrogen or a straight or branched chain alkyl group having from 1 to 12 carbon atoms, R_3 and R_4 are each independently selected from the group consisting of straight and branched chain alkyl groups having from 1 to 12 carbon atoms, cyclic alkyl groups having from 5 to 10 carbon atoms, 1 to 4 carbon atom alkyl substituted or unsubstituted benzyl groups and allyl.

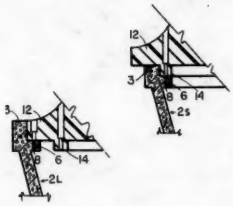
4,888,448

TEMPORARY ELECTRICAL POWER PEDESTAL

Paul G. Moerman, P.O. Box 3053, San Luis Obispo, Calif. 93403

Filed Jun. 16, 1989, Ser. No. 367,147
Int. Cl.[4] H02G 9/00; H02B 9/00
U.S. Cl. 174—38 4 Claims





1. A temporary power pedestal that can be removably affixed to the open upper end of an underground utility vault so as to sit on the vault in place of the lid otherwise used to cover the vault, said temporary power pedestal capable of fitting both the larger and the smaller of the two most commonly used sizes of vaults and comprising:

a hollow-unitary body including a base and a column melding into said base and extending upwardly from said base;

said base having a size and shape that permits it to fit the open upper end of the larger of the two most commonly used sizes of vaults;

said base further including a downwardly-extending wall having a size and shape that permits it to fit the open upper end of the smaller of the two most commonly used sizes of vaults.

4,888,449

SEMICONDUCTOR PACKAGE

Jacob Crane, Woodbridge, Conn.; Barry C. Johnson, Tucson, Ariz.; Deepak Mahulikar, Meriden, Conn., and Sheldon H. Butt, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 4, 1988, Ser. No. 140,859
Int. Cl.[4] H01L 23/10, 23/36
U.S. Cl. 174—52.4 47 Claims

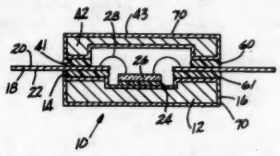
1. A semiconductor package for housing an electrical component comprising:

a metal or metal alloy leadframe having first and second opposite surfaces and adapted to have said electrical component connected thereto;

a copper or copper alloy base member having first and second opposite surfaces with sides there between;

a copper or copper alloy cap member having first and second opposite surfaces with sides there between;

said base and cap members having a metal or metal alloy coating selected from the group consisting of: nickel, tin, cobalt, chromium, molybdenum, tungsten, titanium, zirconium, hafnium, niobium, tantalum, germanium, aluminum and alloys of the foregoing metals on at least a first surface of each; and



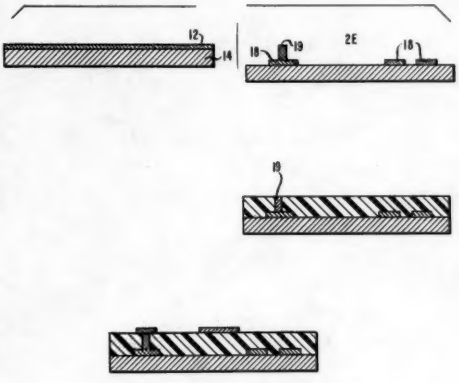
a polymer coating bonding said first coated surface of said base member to said first coated surface of said cap member, said leadframe embedded in said polymer component and disposed between said base and cap member.

4,888,450

CIRCUIT BOARD FABRICATION LEADING TO INCREASED CAPACITY

David J. Lando, Allentown, Pa., and Frederick R. Wight, Jr., West Millington, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 330,011, Dec. 11, 1981, abandoned.
This application Jun. 28, 1985, Ser. No. 750,732
Int. Cl.[4] H05K 1/03
U.S. Cl. 174—68.5 13 Claims



1. A product comprising a first and second pattern of conductive material, an electrically insulating material interposed between said first and second pattern, and an electrical connection between said first and second pattern through said insulating material by a conductive via CHARACTERIZED IN THAT said conductive via and said insulating material is formed by subjecting an energy-sensitive material to electromagnetic radiation processing said energy-sensitive material to form said via and to produce said insulating material wherein said energy-sensitive material comprises an acrylated rubber, an acrylated epoxy having a glass transition temperature of at least 50 degrees C. that is capable of reacting with said acrylated rubber under the influence of said electromagnetic radiation and a viscosity modifier.

4,888,451

ELECTRICAL CONTINUITY MEANS FOR COMPOSITE JOINTS

Darryl Toni, North Haven, and Eliasz Poss, Guilford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 29, 1988, Ser. No. 277,382

Int. Cl.[4] H02G *15/08*

U.S. Cl. 174—94 R **20 Claims**

1. A plurality of articles having a common joint including a mechanical interface, wherein at least one of said articles is a nonconductive article having a conductive layer thereon, and conductive means for conducting an electrical charge through said conductive layer across said joint to a second article wherein the improvement comprises:

said conductive means displaced from

said mechanical interface.

4,888,452

CABLE CONDUIT FOR TEXTILE MACHINES

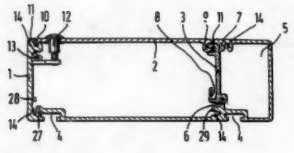
Gerhard Krehl, and Helmut Vögeler, both of Altbach, Fed. Rep. of Germany, assignors to SKF Textilmaschinen-Komponenten GmbH, Fed. Rep. of Germany

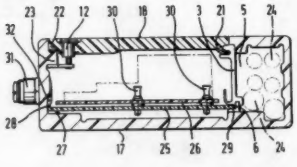
Filed Aug. 19, 1988, Ser. No. 234,038

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727940

Int. Cl.[4] D01H *13/14*; H02G *3/04*

U.S. Cl. 174—101 **12 Claims**





1. A cable conduit for textile machines, said cable conduit adapted to contain supply cables, ground plates, and motor bars connected to said ground plates for the drive and control of an individual drive of the textile machine, comprising:

a housing;

a detachable cover provided on said housing;

an intermediate cover connected to said housing, said intermediate cover dividing said housing into a partial conduit which is not accessible from the outside adapted to receive said supply cables, and a portion which is covered by said detachable cover and adapted to receive said ground plates and motor bars; and

means formed in said housing for securely receiving said ground plates in the portion of said housing covered by said detachable cover;

wherein said means for securely receiving said ground plates in said housing comprises a first groove formed in said housing and positioned such that a portion of each of said ground plates can be received therein and then the ground plates securely clamped in place in said housing by means of said intermediate cover.

4,888,453

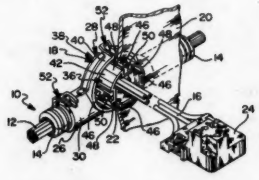
PANEL MOUNTED BREAKOUT FITTING

Raymond J. Blasko, Poland, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 20, 1988, Ser. No. 260,273

Int. Cl.[4] H02G *3/02*

U.S. Cl. 174—135 **4 Claims**



4. A thermoplastic housing for passing leads through an aperture in a panel comprising;

a collar for the leads to pass out of the housing and means to attach the collar to the panel;

the means comprising a flange for engaging a side of the panel outwardly of the aperture,

a pilot ring inwardly of the flange which has a plurality of arcuate portions for supporting the collar in the aperture in the radial direction, and

a plurality of circumferentially spaced deflectable lock arms which are attached to the collar in cantilever fashion between the flange and the pilot ring,

the lock arms having catches at their free ends for engaging the opposite side of the panel outwardly of the aperture to secure the housing to the panel, and

the pilot ring having a plurality of recessed portions which connect the ends of the arcuate portions and which limit the inward deflection of the lock arms as the lock arms pass through the aperture to engage the opposite side of the panel.

4,888,454

CURRENT SUPPLY SYSTEM FOR TRACK-GUIDABLE, RUBBER-TIRED, ELECTRICALLY PROPULSIVE VEHICLES

Diether v. Scarpatetti, Esslingen, and Dietrich Sahm, Bad Urach, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Jun. 9, 1988, Ser. No. 204,257

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1987, 3719213

Int. Cl.[4] B60M *1/04*

U.S. Cl. 191—30 **11 Claims**

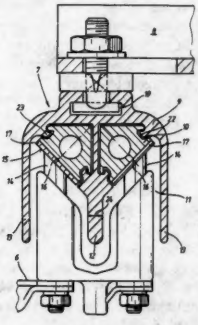
1. Ground-level multiple current supply systems for track-guidable, rubber-tired, electrically propulsive vehicle, comprising:

live rails and current collectors for each pole laid following a track close beside a moving path of the vehicle, said live rails each being formed of an extruded aluminum profile of mutually identical cross-section along the length thereof and shaped symmetrically to a line of symmetry of said cross-section, said live rails each exhibiting a flat contact side located at right angles to the line of symmetry

and including a wear-reducing lining on the contact side for associating with the current collector on a side of the vehicle;

shielding means comprising electrically insulating material forming for each live rail a duct having shielding walls closing on three longitudinal sides of said each live rail, at least two live rails disposed adjacent and parallel to one another and the two ducts enclosing the two live rails including a common shielding wall which forms a partition between the two live rails;

the shielding means being a homogeneous self-supporting extruded profile including pair of ducts open downwards in the installation position for accommodating respective ones of the live rails in the ducts, on the other side of the



openings of the ducts, the shielding means including a fastening means for attaching the shielding means to support arms;

the cross-section of the live rails having a substantially polygonal-house-like shape, the live rails further having the contact sides mutually inclined relative to the common shielding wall;

longitudinal interengagement means formed on both sides of the live rails and correspondingly complementary interengagement means formed on the insides of the ducts of the shielding means, which the longitudinal and complementary interengagement means interlock mutually positively and in barb fashion so that the live rails are slidable axially into the shielding means but are immediately retained firmly therein transversely to the slide-in direction.

4,888,455

WATER LEAK DETECTOR AND METHOD THEREFOR

James B. Hanson, 4610 N. 68th St., #475, Scottsdale, Ariz. 85251

Filed Feb. 27, 1989, Ser. No. 316,484
Int. Cl.[4] H01H *29/00*
U.S. Cl. 200—61.04 **4 Claims**

1. A water leak detector comprising:

a spring loaded switch comprising:

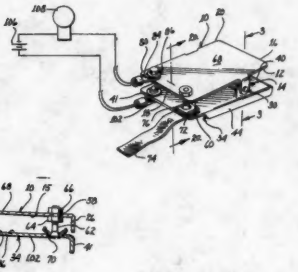
a pair of metal plates having a first electrical contact means for providing a first electrical contact mounted on a front edge of one of said pair of metal plates and having a second electrical contact means for providing a second electrical contact aligned with said first electrical contact means and mounted on a front edge of the other of said pair of metal plates, said first and second electrical contacts are normally open;

a spring and shaft means for rotatably securing and forcing said front edges of said pair of metal plates together comprising:

a cylindrical shaft upon which said pair of metal plates are mounted;

a compressed coil spring coaxially disposed on said shaft having a first end of said spring in contact with a first distal portion of a surface of one of said pair of metal plates and a second end of said spring in contact with a second distal portion of a surface of said other of said pair of metal plates, said first and second ends of said spring pushing said first and second distal portions away from each other and said front edges of said pair of metal plates towards each other; and

means mounted on said front edges of said pair of metal plates opposite said first and second electrical contacts for maintaining a separation between said first and second



electrical contacts of said switch in the absence of moisture said means for maintaining comprising a moisture responsive frangible material overlying one of said pair of metal plates, having a hole, the other of said metal plates having a puncturing means for puncturing said frangible material, said hole located in one of said pair of metal plates and aligned with said puncturing means mounted on said other of said pair of metal plates, said puncturing means punctures said frangible material when said frangible material becomes moistened.

4,888,456

VEHICLE TURN SIGNAL CANCELLING DEVICE

Masaru Suzuki, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Dec. 8, 1988, Ser. No. 281,515
Claims priority, application Japan, Dec. 14, 1987, 62-315780
Int. Cl.[4] H01H *3/16*; B60K *20/06*
U.S. Cl. 200—61.27 **17 Claims**

1. A cancelling device for a turn signal of a vehicle comprising:

a mechanism portion having one ratchet portion which is movable to a cancelling position in accordance with the operation of an operation lever which is operated from a neutral position to right and left turn positions which are symmetrical with respect to said neutral position;

a first cylindrical body through which a steering shaft is passed, said first cylindrical body including means for coupling said first cylindrical body with a steering wheel such that said first cylindrical body turns with said steering wheel in the same direction as that in which said steering wheel is turned;

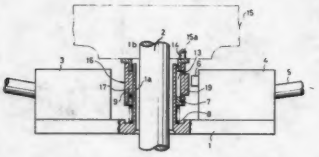
a second cylindrical body disposed on the outer periphery of said first cylindrical body wherein said second cylindrical body is rotatable relative to said first cylindrical body;

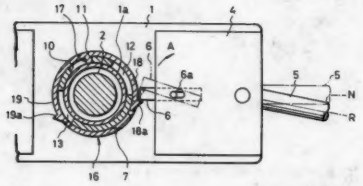
a driving mechanism for drivingly engaging said first cylindrical body with said second cylindrical body after eliminating a predetermined amount of play so as to turn said cylindrical body in the same direction as that in which said first cylindrical body is turned when said first cylindrical

body is turned to the left or to the right by turning said steering wheel in the left or right direction;

elastically deformably first and second cam portions formed on said second cylindrical body at positions that are symmetrical in a circumferential direction of said second cylindrical body with respect to said driving mechanism; and

first and second slip portions formed in said first cylindrical body at positions respectively adjacent said first and second cam portions, whereby the cancelling position of said ratchet is located within paths of movement of said first





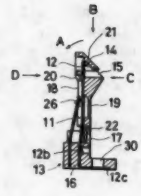
and second cam portions such that said first slip portion allows said first cam portion to be elastically deformed inwardly when said second cylindrical portion turns in the rightward direction and said first cam portion thereby abuts against said ratchet portion located at said cancelling position, and said second slip portion allows said second cam portion to be elastically deformed inwardly when said second cylindrical body turns in the leftward direction and said second cam portion thereby makes contact with said ratchet portion located at said cancelling position.

4,888,457

SWITCH FOR DETECTING ERRONEOUS ERASE PROTECTION FIN OF TAPE CASSETTE

Minekazu Miyakawa, Tomioka, Japan, assignor to Iizuka Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 210,008
Claims priority, application Japan, Jun. 23, 1987, 62-96431[U]
Int. Cl.[4] H01H *1/14*; G11B *15/04*
U.S. Cl. 200—283 **6 Claims**



1. A switch for detecting an erroneous erase protection fin provided on a tape cassette comprising

a stationary contact strip made of electrically conductive metal,

a movable contact strip made of electrically conductive metal, said movable contact strip being aligned with said stationary contact strip when viewed in a direction in which said movable contact strip is deformable, and

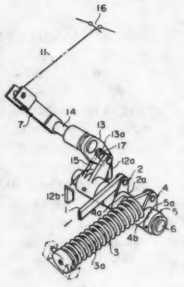
a main body made of electrically insulating material and having a base portion for supporting said stationary and movable contact strips, a first actuation portion which is engaged with the stationary contact strip and a tip of the movable contact strip, a first flexible portion provided between the base portion and the first actuation portion, a second actuation portion which is engaged with the movable contact strip, and a second flexible portion provided between the second actuation portion and the base portion said base, first and second actuation portions and said first and second flexible portions being integrally formed; whereby when the cassette has the fin, the first and second actuation portions are moved to place the stationary and movable contact strips into contact with each other, but when the cassette does not have the fin, the second actuation portion is not pushed by the fin so that the movable contact strip is separated from the stationary contact strip.

4,888,458

APPARATUS FOR DISCONNECTING A SWITCH OF A HIGH VOLTAGE ELECTRIC CIRCUIT

Hiroshi Suzuyama; Minoru Sakaguchi, and Osamu Mikami, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,665
Claims priority, application Japan, Jul. 10, 1987, 62-170994
Int. Cl.[4] H01H *3/46*
U.S. Cl. 200—400 **18 Claims**



1. An apparatus for operating switches, the apparatus comprising a driving shaft;

an operation lever portion rotatably mounted on said driving shaft;

an operating source connected at one end to said operation lever portion and having a dead point construction in which, as said operation lever portion is rotated, energy is accumulated and then is discharged;

an outer retractor lever activated by energy accumulated in the operating source thereby operating the switches through a control lever connected to said outer retractor lever, said outer retractor lever is fixed to an operation shaft disposed substantially parallel to said driving shaft;

a main lever having a sliding recess therein fixed to said operation shaft;

an abutment provided on a driving lever fixed to said driving shaft and received in such sliding recess of said main lever; and

position regulating stoppers respectively provided at operation completion positions of said driving lever, said operation completion positions corresponding to limits of rota-

tional movement range wherein an angle subtended by axis of said main lever and said driving lever slightly exceeds 90°.

4,888,459

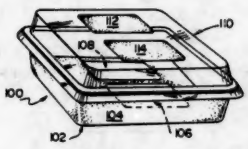
MICROWAVE CONTAINER WITH DIELECTRIC STRUCTURE OF VARYING PROPERTIES AND METHOD OF USING SAME

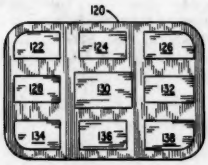
Richard M. Keefer, Peterborough, Canada, assignor to Alcan International Limited, Montreal, Canada

Filed Dec. 18, 1986, Ser. No. 943,563

Int. Cl.⁴ H05B *6/80*

U.S. Cl. 219—10.55 E **18 Claims**





1. A package of material to be heated in a microwave oven, comprising a container and a body of material to be heated disposed in the container, said container comprising an open-topped tray carrying the body of material and a lid covering the tray to form a cavity, the container and the body defining fundamental modes of microwave energy in said cavity, at least one extended surface of the container being provided with mode generating means for generating, within the cavity, at least one microwave energy mode of a higher order than that of said fundamental modes, the mode-generating means being dimensioned and positioned with respect to the body of material in the container for causing microwave energy in said at least one higher-order mode to propagate into the body of material thereby to locally heat the body of material, wherein the mode generating means comprises at least a first dielectric wall portion of the container defining a first region of the extended surface and a second dielectric wall portion of the container defining a second region of the extended surface contiguously surrounding the first region, one of these two wall portions having an electrical thickness substantially greater than that of the other.

4,888,460

FIXING STRUCTURE FOR COMPONENTS OF A COOKING APPLIANCE

Yuichiro Oya, Sennan, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 108,994, Oct. 16, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,095

Claims priority, application Japan, Mar. 19, 1987, 62-40557

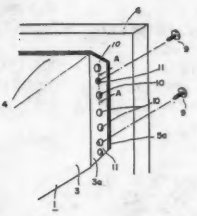
Int. Cl.⁴ H05B *6/64*

U.S. Cl. 219—10.55 R **4 Claims**

1. A fixing configuration which joins an internal cooking compartment to an external housing of a cooking appliance which comprises:

an internal cooking compartment consisting of a front plate, ceiling plate, rear plate having first outwardly bent flanged edges on end portions of said rear plate, and a main base plate having a U-shaped configuration including a bottom plate and two opposing side plates, said side plates of said main base plate having second outwardly bent flanged edges on end portions thereof corresponding to and abutting with said first flanged edges, said first and second flanged edges being joined by burring caulking fixing said rear plate to said main base plate;

an external housing including a back plate juxtapositioned to said rear plate of said internal cooking compartment having a plurality of spaced holes formed therein;



said joined first and second flanged edges of said internal cooking compartment having a plurality of spaced double contraction holes formed therethrough in a predetermined direction, such that said plurality of spaced double contraction holes are aligned with said plurality of spaced holes of said back plate of said external housing, there being a predetermined space between said aligned double contraction holes and said back plates holes; and

a plurality of threaded screw members to be inserted into said aligned double contraction holes and said back plates holes for fixing said first and second joined flanged edges of said internal cooking compartment to said back plate of said external housing.

4,888,461

HIGH-FREQUENCY HEATING APPARATUS

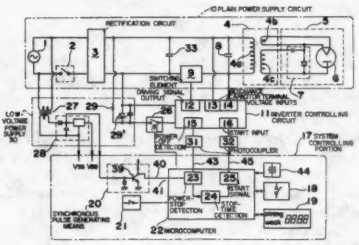
Teruhisa Takano, Osaka; Hitoshi Kurita, Yamatokoriyama; Yasuteru Fujii, Gojo; Haruo Suenaga, Soraku, and Masashi Yano, Kashihara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 8, 1988, Ser. No. 153,411

Claims priority, application Japan, Feb. 10, 1987, 62-27409; Feb. 10, 1987, 62-27410; Feb. 10, 1987, 62-27411; Feb. 20, 1987, 62-38406; Mar. 5, 1987, 62-50504; Mar. 9, 1987, 62-53311; Mar. 13, 1987, 62-59376

Int. Cl.⁴ H05B *9/06*

U.S. Cl. 219—10.55 B **8 Claims**



7. A high frequency heating apparatus comprising a rectifi-

cation power supply for feeding a DC current, a high frequency transformer and a semiconductor switching element connected with the output of the rectification power supply, a door switch which operatively cooperates with the opening and closing of the door of a heating chamber to cut off the output of the rectification power supply when the door has been opened, a door opening and closing detection means for detecting the presence or absence of the output of the rectification power supply to detect the opening and closing of the door switch.

4,888,462

DEVICE AND PROCESS FOR MACHINING BY ELECTROEROSION

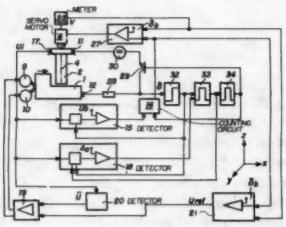
Jean-Claude Diot, Douvaine, France, and Roger Girardin, Vernier, Switzerland, assignors to Charmilles Technologies S.A., Meyrin, Switzerland

Filed Feb. 2, 1988, Ser. No. 151,452

Claims priority, application Switzerland, Feb. 3, 1987, 384/87

Int. Cl.[4] B23H *1/00, 7/02, 7/28*

U.S. Cl. 219—69.2 **24 Claims**



1. A device for electroerosive machining of a workpiece in the presence of a machining fluid, comprising:

a tool electrode spaced from said work piece a distance defining a machining gap in which a portion of said fluid is circulated, said electrode being adapted to erode said workpiece by development of a series of sparks between them in said machining gap, said electrode being mobile with respect to said workpiece in a feed direction, and said electrode also being mobile with respect to said workpiece in a second direction different from said feed direction;

measuring circuit means for: (a) determining, in correspondence to each spark in said series of sparks, the degree of contamination of said portion of said machining fluid circulating in said gap; (b) comparing said determined degree of contamination with a reference degree of contamination; and (c) delivering a signal when said determined degree of contamination is at least equal to said reference degree of contamination; and

at least one servo circuit means for modulating movement of said electrode in said second direction as a function of said signal.

4,888,463

THERMAL MICROSCOPE STAGE

Thomas F. Middlebrook, 184 S. Union St., Elgin, Ill. 60123

Filed Sep. 8, 1987, Ser. No. 93,740

Int. Cl.[4] H05B *3/26*

U.S. Cl. 219—201 **3 Claims**

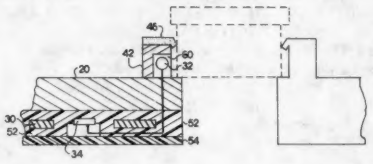
1. A heating device adapted to be placed onto the stage of a microscope and provide heat to a specimen within a container thereon comprising:

a planar member exhibiting an aperture therein and having a pattern of electrical heating means distributed across one surface thereof and comprising a pattern extending proximate said aperture;

temperature sensing means affixed to said planar member;

electrical power controlling means electrically connected to said heating means and said temperature sensing means to provide accurate temperature control of a sensed temperature; and

a thermally conductive ring member arranged to circumscribe said aperture for holding the container therein,



wherein said ring member exhibits anti-friction means on an upper inside edge thereof to facilitate insertion of the specimen container.

4,888,464

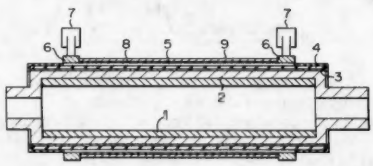
HEAT ROLL FOR ELECTROPHOTOGRAPHY

Ryoichi Shibata, Fukaya; Kiyoshi Kinugawa, Kumagaya; Tsutomu Iimura, Tachikawa, and Yasuo Sawano, Saitama, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,982

Int. Cl.[4] B21B *31/08, 27/06;* **H05B** *3/02;* **G03G** *15/20*

U.S. Cl. 219—216 **6 Claims**



1. A heat roll for electrophotography of a surface-heating type having a heating resistor on an outer surface of a hollow cylindrical core made of mild steel, said heat roll comprising a high-temperature conductive material which is formed into the shape of a pipe or a round bar and has a greater coefficient of thermal conductance than that of mild steel, said high-temperature conductive material being inserted in said core.

4,888,465

HOT BEVERAGE MACHINE WITH THICK FILM ELECTRIC HEATER

Erich Hoffmann, Bergisch-Gladbach, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany

Filed Jun. 16, 1988, Ser. No. 207,762

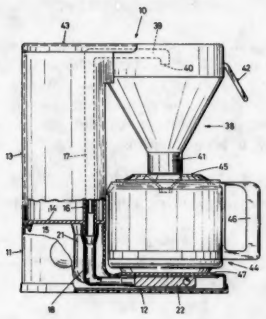
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723016

Int. Cl.[4] A47J *31/00*

U.S. Cl. 219—301 **20 Claims**

1. Machine for making hot beverages by contacting a heated liquid with a flavoring agent, such as tea or coffee, comprising a housing having a container for a supply of liquid; a holder supported by said housing and arranged to contain a supply of flavoring agent; and conduit means provided in said housing and defining a path for the flow of liquid from said container to

said holder, said conduit means including an electric heater which defines a portion of said path and includes at least one



thick film conductor, switch means in series with said conductor, and current regulating means in series with said conductor.

4,888,466

MACHINE FOR MAKING HOT TEA

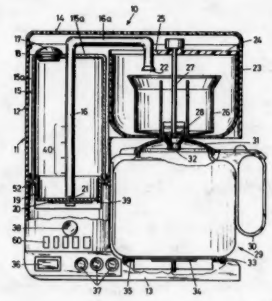
Erich Hoffmann, Bergisch-Gladbach, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany

Filed Jun. 16, 1988, Ser. No. 207,763

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723018

Int. Cl.[4] A47J *31/54, 31/04*

U.S. Cl. 219—301 **20 Claims**



1. Machine for making a hot beverage, particularly tea, by contacting a heated liquid with a flavoring agent, comprising a housing having a pressure-resistant container for a supply of liquid, said container having an upper portion and a lower portion; a steeping receptacle for a supply of flavoring agent and hot beverage in said housing, said receptacle having a sealable outlet for hot beverage; an electric heater for the supply of liquid in said container, including at least one insulating carrier in the region of the lower portion of said container and at least one thick film conductor on said carrier; and conduit means for conveying heated liquid from said container into said receptacle.

4,888,467

MACHINE FOR MAKING COFFEE AND OTHER HOT BEVERAGES

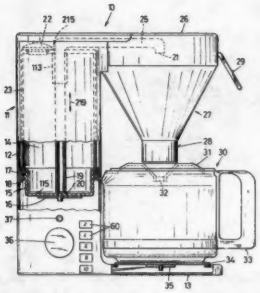
Erich Hoffmann, Bergisch-Gladbach, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co., KG., Solingen, Fed. Rep. of Germany

Filed Jun. 16, 1988, Ser. No. 207,764

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723017

Int. Cl.[4] A47J *31/00*

U.S. Cl. 219—301 **23 Claims**



1. Machine for making hot beverages by contacting a heated liquid with a flavoring agent, such as tea leaves or comminuted coffee beans, comprising a housing having a pressure-resistant container for a supply of liquid; a holder supported by said housing and arranged to contain a supply of flavoring agent; an electirc heater for the supply of liquid in said container, comprising an insulating carrier, at least one thick film conductor on said carrier, a switch in circuit with said conductor, and current regulating means in circuit with said conductor; and conduit means for conveying heated liquid from said container into contact with flavoring agent in said holder.

4,888,468

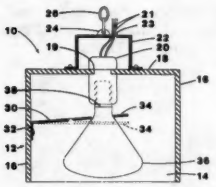
BROODER LAMP

Benjamin Maendel, McGregor, Canada, assignor to Baker Colony Farms Ltd., McGregor, Canada

Filed Jul. 14, 1988, Ser. No. 218,850

Int. Cl.[4] H05B *1/00;* A01K *31/20;* F21V *15/00*

U.S. Cl. 219—347 **4 Claims**



1. In a brooder lamp comprising a reflector housing and a bulb socket secured to the housing for receiving a heat lamp bulb base, a resilient metal plate secured to the housing and extending across the socket, the plate having an opening therein aligned with the socket, the opening being so sized and the metal plate being so positioned that with the base of the bulb inserted through the opening and engaged with the socket, the metal plate is engaged with the bulb and is resiliently deflected towards the socket.

4,888,469

DOUBLE-REGIME ELECTRIC HEATING CONVECTOR

Jean Hennuy, Villefranches/Saone, and Guy Wojcik, Lyons, both of France, assignors to SEB S.A., Selongey, France

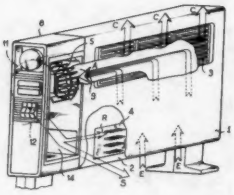
PCT No. PCT/FR87/00488, § 371 Date Aug. 5, 1988, § 102(e) Date Aug. 5, 1988, PCT Pub. No. WO88/04393, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 9, 1987, Ser. No. 246,668

Claims priority, application France, Dec. 10, 1986, 86 17280

Int. Cl.[4] F24H *3/04*

U.S. Cl. 219—370 9 Claims



1. A convector with electric heating resistors and having two operating modes, the first mode being a natural convection mode and the second mode being a forced air mode obtained by means of an air-blowing unit (5), said convector comprising an enclosure (1) forming a convection chimney which has a bottom air admission opening (2) and a top air delivery opening (3), a heating resistor (4) being placed within the enclosure (1) downstream of the air admission opening (2), an air-blowing unit (5) comprising an impeller rotataby mounted in a compartment (8) positioned on one side of the enclosure (1), said compartment having a top portion communicating with the interior of the enclosure (1) by means of a first opening (9) and said compartment having a bottom portion communicating with the exterior of the convector by means of a second opening (7), said impeller being adapted to extract, through said first opening (9), a portion of the hot air rising by natural convection within said chimney and to blow a portion of said extracted air through said second opening (7), wherein said compartment communicates with the interior of said chimney by means of an additional opening (14, 14*a*) positioned below said first opening (9).

4,888,470

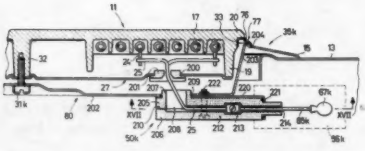
SEALED ELECTRIC HOTPLATE

Felix Schreder, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Gerate Blanc u. Fischer, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 900,781, Aug. 27, 1986, Pat. No. 4,766,290. This application Aug. 19, 1988, Ser. No. 234,263

Int. Cl.[4] H05B *3/70*

U.S. Cl. 219—458 14 Claims



1. A sealed electric hotplate for fitting in a mounting opening of a mounting plate, comprising:

a hotplate body with a planar, sealed cooking surface, electric heating resistors which are embedded in electrically insulating manner on an underside of the hotplate body and can be connected to a power supply by connecting lead means;

electric connecting means for connecting the heating resistors to a connecting member located below a mounting plate;

sheet metal trim ring means surrounding the hotplate body;

cover plate means fixed to the hotplate body covering the underside of the hotplate body and having an opening;

tray means fixed to the hotplate covering an underside of the cover plate means having an opening and having an upper rim which is pressed against the trim ring means from below;

electrically insulating bushing means for guiding the connecting lead means through the opening in the cover plate means; and,

electrically insulating means mounted at the opening of the tray means for guiding the connecting lead means therethrough.

4,888,471

AN IMPROVEMENT IN A DEVICE FOR HIGH ACCURACY THERMAL REGULATIONS OF AN ENCLOSURE

Didier Thorax, Argenteuil, and Marotel Gerard, Sartrouville, both of France, assignors to Compagnie D'Electronique et de Piezo-Electricite C.E.P.E., Argenteuil, France

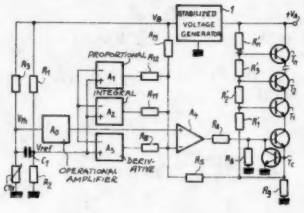
PCT No. PCT/FR87/00031, § 371 Date Sep. 29, 1987, § 102(e) Date Sep. 29, 1987, PCT Pub. No. WO87/04816, PCT Pub. Date Aug. 13, 1987

PCT Filed Feb. 3, 1987, Ser. No. 112,717

Claims priority, application France, Feb. 4, 1986, 8601524; Dec. 12, 1986, 8617405

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—501 20 Claims



1. An improvement in a device for thermal regulation of an enclosure comprising:

a temperature measuring circuit which comprises a resistor bridge with four arms, at least one heat-sensitive element on one arm;

an output amplifier having an inverting input directly connected to a common point between two of said bridge arms which is defined as a first output of said resistor bridge, and a non-inverting input connected to a second output of the resistor bridge, said second output being located at the common point between two other arms, said output amplifier delivering an output control signal which is representative of the difference between the measured temperature of the enclosure and a reference temperature;

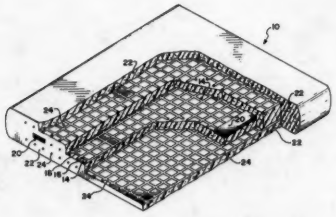
a circuit for heating the enclosure which is supplied from a voltage source and regulated by the temperature measuring circuit, said heating circuit comprising at least one control transistor having an emitter resistor for delivering a heating current which is adjustable based upon the output of said control transistor wherein the device further comprises a negative DC current feedback loop directly connected between the emitter resistor and the inverting input of said output amplifier.

4,888,472

RADIANT HEATING PANELS

David G. Stitz, Winnipeg, Manitoba, Canada, assignor to David G. Stitz, Winnipeg, Canada

Filed May 12, 1988, Ser. No. 192,961
Int. Cl.[4] H04B *3/34*
U.S. Cl. 219—548 19 Claims



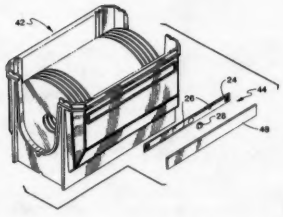
7. An electric heater including: a heating element comprising an open mesh net of heat-resistant filaments carrying electrically resistive material, conductive buses connected to the material at spaced locations thereon, a matrix of cured, thermosetting synthetic resin in which the net and buses are embedded, the resin being reinforced on opposite sides of the net with an electrically insulating heat-resistant fibre material and an electrical ground layer comprising a conductive foraminous material layer embedded within the body of fibre reinforced resin material on each side of the heating element and separated therefrom by a layer of the fibre reinforced synthetic resin.

4,888,473

WAFER DISK LOCATION MONITORING SYSTEM AND TAGGED PROCESS CARRIERS FOR USE THEREWITH

Alexander N. Rossi, Pleasanton, and Mario N. Sancen, Antioch, both of Calif., assignors to Fluoroware, Inc., Chaska, Minn.

Continuation-in-part of Ser. No. 61,935, Jun. 11, 1987, Pat. No. 4,827,110. This application May 3, 1989, Ser. No. 346,915
Int. Cl.[4] G06F *15/46*
U.S. Cl. 235—376 36 Claims



1. A method for monitoring the progress of a plurality of batches of disks through a multiplicity of operations atsseveral locations comprising the steps of:

inserting each batch of disks into a carrier constructed and arranged for supporting the disks in a parallel, axially arranged spaced array;

providing each carrier with a transponder tag constructed, arranged and coded for uniquely identifying the carrier and the batch inserted therein, said transponder tag encapsulated for protection from harsh chemical environments to which the disks and carrier are normally exposed and said transponder tag maintained encapsulated in precise relationship for correct identification by a reader unit constructed and arranged for determining the identification of any transponder tag within its detection range;

detecting the presence of each carrier at one of the several locations by operating a multiplicity of limited range reader units, each of which is positioned adjacent to one of the locations; and

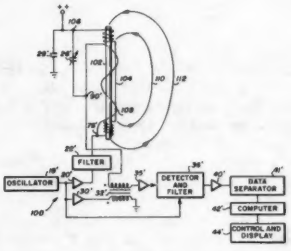
monitoring the progress of at least one batch of disks through various locations by updating and storing location information received from the reader units.

4,888,474

PROXIMITY IDENTIFICATION SYSTEM WITH LATERAL FLUX MAGNETIC ROD COUPLING

Charles A. Walton, 19115 Overlook Rd., Los Gatos, Calif. 95030

Filed Jun. 8, 1988, Ser. No. 203,944
Int. Cl.[4] G06K *7/68*
U.S. Cl. 235—449 31 Claims



1. A proximity identification system comprising:

a reader section having a reader circuit connected to a reader antenna, said reader circuit for supplying a power signal and for detecting an identifier signal, said reader antenna for inductively coupling with an identifier antenna for transmitting said power signal to said identifier antenna and for receiving said identifier signal from said identifier antenna, said reader antenna comprised of a ferromagnetic rod having wire windings; and

an identifier section having an identifier circuit connected to an identifier antenna, said identifier circuit for generating said identifier signal responsive to said power signal.

4,888,475

THERMALLY READABLE ENCODING AND ACTIVATION THEREOF

Thomas Müllenmeister, Grosshansdorf, Fed. Rep. of Germany, assignor to Gerhard Rosorius, Quickborn-Heide, Fed. Rep. of Germany

Filed Jun. 1, 1987, Ser. No. 55,835
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1986, 3620369
Int. Cl.[4] G06K *19/00*
U.S. Cl. 235—487 22 Claims

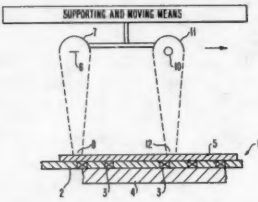
1. A thermally encoded and read apparatus comprising

a body of material having a first thermal conductivity;

means along a path in said body defining a plurality of spaced regions having a second thermal conductivity significantly different from said first thermal conductivity so that said path traverses regions having both of said first and second thermal conductivities;

means for substantially uniformly applying to at least part of said body along said path one of a heat sink and source and subsequently removing said sink or source;

means movable relative to said path for detecting temperature differences between said regions; and



a covering layer which is substantially opaque in the visible spectrum.

4,888,476

OPTICAL SCANNING SYSTEM FOR FOCUSSING A COMPACT-DISK PLAYER

Friedhelm Zucker, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, VS-Villingen, Fed. Rep. of Germany

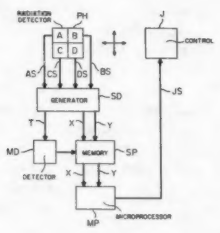
PCT No. PCT/EP87/00620, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/03309, PCT Pub. Date May 5, 1988

PCT Filed Oct. 21, 1987, Ser. No. 222,921

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1986, 3635840

Int. Cl.[4] G02B *7/11*; G11B *7/09*

U.S. Cl. 250—201 **8 Claims**



1. A scanning system with an optical axis for scanning a surface having a center location comprising: a source of radiation emitting rays onto a surface being scanned about said center location, said rays being reflected by said surface, a radiation detector having at least two individual detectors; at least one focusing element for focusing rays reflected by said surface onto said radiation detector, said individual detectors having output signals; means for constructing a summation signal and at least one difference signal from said output signals; means for adjusting said radiation detector perpendicular to said optical axis by ascillating selectively one of said source of radiation, said focusing element, or said surface so that a focal point arrives in front of said radiation detector when the oscillating focusing element, oscillating source of radiation, or oscillating surface is displaced by a maximum in one direction, said focal point arriving behind said radiation detector when said focusing element, source of radiation, or surface is displaced by a maximum in another direction; and means for storing the value of said difference signal when said summation signal is at a maximum.

4,888,477

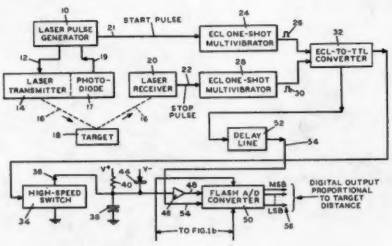
RANGE MEASUREMENT FOR ACTIVE OPTICAL RECOGNITION DEVICES

Donald B. Nankivil, Santa Ana, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Nov. 3, 1988, Ser. No. 266,736

Int. Cl.[4] G01C *3/08*

U.S. Cl. 250—201 **8 Claims**



1. A laser range echo device for measuring distances in the decimeter range, comprising:

(a) laser beam transmitting means for transmitting a pulse of laser light toward a target;

(b) start pulse generating means for generating a start pulse upon transmission of said laser pulse;

(c) laser receiver means for generating a stop pulse in response to the receipt of the reflection of said laser light pulse from said target;

(d) a high-speed switch arranged to be actuated for a predetermined time following the onset of said start pulse;

(e) capacitive means for producing a ramp voltage in response to the actuation of said switch, said ramped voltage changing substantially linearly from a starting value to an ending value in a matter of nanoseconds; and

(f) a flash A/D converter arranged to sample the instantaneous value of said ramped voltage in response to said stop pulse;

(g) whereby said flash A/D converter provides a digital representation of said instantaneous value with an accuracy sufficient to digitally represent the travel distance of said laser light pulse in increments in the decimeter range.

4,888,478

LINE TRACER IMPROVED CORNER CIRCUIT WITH SPEED VARYING SAMPLING

Enn Vali, Burlington, Canada, assignor to Westinghouse Canada Inc., Hamilton, Canada

Filed Aug. 31, 1987, Ser. No. 90,901

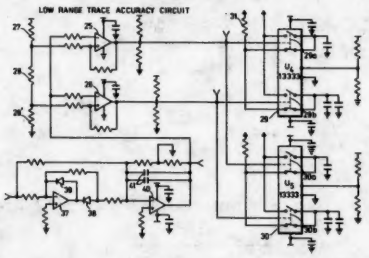
Claims priority, application Canada, Apr. 1, 1987, 533622

Int. Cl.[4] G05B *1/00, 21/02*

U.S. Cl. 250—202 **5 Claims**

3. An optical pattern tracer including a circular scanning photosensor, means to generate a pair of sinusoids at ninety electrical degrees to each other, means to generate from said photosensor a sampling signal indicative of the relative rotational position of said pattern being traced and said photosensor, means to sample and store on capacitors, the value of each of said pair of sinusoids at the time of occurence of said sam-

pling signal said stored value representing the coordinate velocity required to move said tracer around said pattern at a



selected velocity and means to adjust the capacitance of said capacitors in accordance with said selected velocity.

4,888,479

TOUCH PANEL APPARATUS

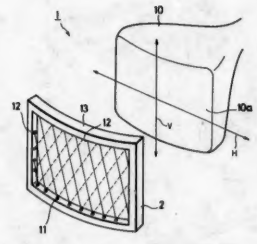
Hideshi Tamaru, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 315,470

Claims priority, application Japan, Mar. 7, 1988, 63-53186; Nov. 18, 1988, 63-291934

Int. Cl.[4] G01V *9/04*

U.S. Cl. 250—221 **5 Claims**



1. A touch panel apparatus comprising:

a display having a display surface;

a first beam generating means for generating a first set of beams skewed in a first diagonal direction, arranged in parallel to each other and aligned from a first upper side of the display surface to the lower opposite side of the display surface of said display;

a first beam scanning means coupled to said first beam generating means for scanning said display surface by said first set of beams with a predetermined sequence;

a second beam generating means for generating a second set of beams skewed in a second diagonal direction, arranged in parallel to each other and aligned from a second upper side of the display surface to the lower opposite side of the display surface of said display;

a second beam scanning means coupled to said second beam generating means for scanning said display surface by said second set of beams with a predetermined sequence;

first detecting means for determining a first address based on an interrupted beam first appearing in the alignment sequence of said first set of beams; and

second detecting means for determining a second address based on an interrupted beam first appearing in the alignment sequence of said second set of beams.

4,888,480

OPTICAL SENSING ARRANGEMENTS WITH WAVELENGTH AND TIME-DISPLACEMENT DETECTION

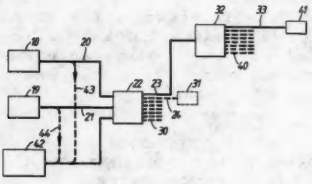
John P. Dakin, Hampshire, and David J. Pratt, Suffolk, both of Great Britain, assignors to Plessey Overseas Limited, Ilford, England

Filed Dec. 10, 1987, Ser. No. 131,167

Claims priority, application United Kingdom, Dec. 10, 1986, 8629478

Int. Cl.[4] G01J *3/50*

U.S. Cl. 250—226 **3 Claims**



1. An optical sensing arrangement comprising two laser light sources for producing simultaneous optical pulse signals of two different wavelengths, in which these optical pulse signals are combined by optical coupler means and transmitted over a plurality of discrete optical fibre paths of different lengths terminated by respective sensors for sensing certain parameters at predetermined locations, and in which time-displaced return signals at different wavelengths received over the optical fibre paths from the respective sensors are fed to a single receiver, said receiver including means utilizing the intensity of signals of one of said two wavelengths as a reference basis for correctively determining intensity of signals at the other of said two wavelengths in order to compensate for unknown losses when providing an indication of measurand(s) at the location of the optical sensors.

4,888,481

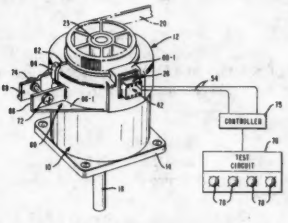
ALIGNING AND PROTECTIVE COVER FOR A MOTOR

Fredrik L. N. Kallin, Kitchener, and Bruce A. Reid, Elmira, both of Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 19, 1988, Ser. No. 286,407

Int. Cl.[4] G01D *5/34*

U.S. Cl. 250—231 SE **9 Claims**



1. An aligning and protective apparatus (hereinafter referred to as apparatus) for a motor, said motor having:

a cylindrical housing and an end portion joining said cylindrical housing to form a circular rim,

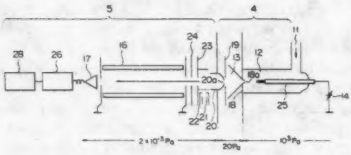
an output member extending from said end portion; and

a timing member fixed to said output member to rotate therewith;

said apparatus comprising:

a sensor housing having at least one sensor therein to coact with said timing member when said
housing is positioned on said motor; and sensor
a cover means for adjustably securing said sensor housing on said motor;
said cover means being generally circular in shape to cover an area of said end portion, an area of said cylindrical housing, and said circular rim;
said cover means having a receiving area therein to receive said sensor housing;
said cover means being discontinuous in one area thereof to enable said cover means to be expanded to facilitate mounting said cover means with said sensor housing therein on said motor; and
said cover means having locking means for adjustably locking said cover means on said motor after said cover means is rotated on said motor so as to position said sensor in said sensor housing in operative relationship with said timing member and said motor.

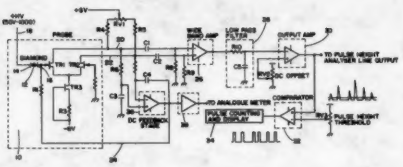
4,888,482
ATMOSPHERIC PRESSURE IONIZATION MASS SPECTROMETER
Yoshiaki Kato, Mito, Japan, assignor to Hitachi, Ltd., Tokyo, Japan
Filed Mar. 30, 1988, Ser. No. 175,264
Claims priority, application Japan, Mar. 30, 1987, 62-76569
Int. Cl.[4] H01J *49/26*
U.S. Cl. 250—281 **10 Claims**



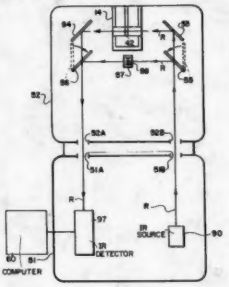
1. An atmospheric pressure ionization mass spectrometer comprising:
an ionization unit having corona discharge means for introducing thereto gaseous mobile phase molecules and gaseous solute molecules, and ionizing said mobile phase molecules through corona discharge under an atmosphere of said mobile phase molecules and said solute molecules;
an ion reaction unit for ionizing said solute molecules through molecular ion reaction of said ionized mobile phase molecules with said solute molecules; and
an ion analysis unit for mass analyzing said ionized solute molecules;
wherein said corona discharge means comprises discharge electrode means for conducting corona discharge at a plurality of points, and a DC power supply for applying a DC voltage to said discharge electrode means.

4,888,483
DIAMOND RADIATION PROBE
Jacobus H. Grobbelaar, 18 Truro Road New Redruth, Alberton, Tv1., South Africa
Filed Oct. 26, 1988, Ser. No. 263,011
Claims priority, application South Africa, Oct. 27, 1987, 87/8050
Int. Cl.[4] G01J *1/00*; G01T *1/00, 1/22, 1/24*
U.S. Cl. 250—336.1 **11 Claims**

1. Apparatus for measuring nuclear radiation comprising a probe which includes a counting diamond to which a pair of electrical contacts are attached, and a pre-amplifier which comprises at least one field-effect transistor, the contacts on the diamond being connected to the input of the pre-amplifier and a DC bias voltage being applied across the diamond in use, the pre-amplifier including filter means for separating the output of the pre-amplifier into a first signal having only an AC component and a second signal having both a DC and and AC component.



4,888,484
APPARATUS AND METHOD FOR SPECTROPHOTOMETRIC ANALYSIS OF A MATERIAL IN A MOVING PROCESS STREAM
Robert J. Harvey, Charlotte, N.C., assignor to Automatik Machinery Corporation, Charlotte, N.C.
Continuation-in-part of Ser. No. 831,296, Feb. 20, 1986, Pat. No. 4,717,827. This application Dec. 31, 1987, Ser. No. 139,964
Int. Cl.[4] G01N *21/35*
U.S. Cl. 250—343 **7 Claims**



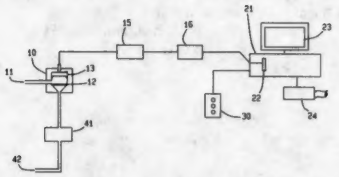
1. An apparatus for spectrophotometric analysis of material in a moving process stream wherein the material is directed into an observation chamber within a sample cell and exposed to a radiation beam suitable for spectrophotometric purposes, said apparatus comprising:
(a) a radiation source and a radiation detector contained within a first compartment;
(b) a second compartment environmentally isolated from said first compartment and within which said sample cell is contained;
(c) reflective means positioned within said second compartment for receiving the radiation beam from said first compartment, directing said radiation beam through said sample cell and the material to be analyzed contained therein, and directing the radiation beam back into the second compartment and the radiation detector positioned therein;
(d) said second compartment containing means for maintaining the environment therein within a range acceptable for radiation analysis of the material within the sample cell; and
(e) reference means positioned within said second compartment for diverting said radiation beam from passage through said material and for determining a reference spectra within the same environment as the sample cell and directing the diverted beam to the radiation detector.

4,888,485

BETA/ALPHA CONTINUOUS AIR MONITOR

Gregory K. Becker, Idaho Falls, Id., and Dowell E. Martz, Grand Junction, Colo., assignors to The United States Department of Energy, Washington, D.C.

Filed Jun. 27, 1988, Ser. No. 211,647
Int. Cl.[4] G01T *1/24*
U.S. Cl. 250—370.06 **11 Claims**



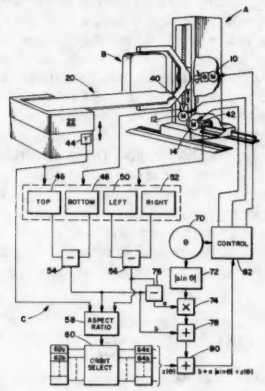
1. An air monitor comprised of:
spectrographic detection means for sampling, measuring, and graphically displaying the energy levels of alpha and beta particles,
curve fitting means for extrapolating curves depicting repeated measurements of said energy levels, and
alarm means for signaling significant deviations from said extrapolated curves.

4,888,486

SCANNING NUCLEAR CAMERA WITH AUTOMATIC ORBIT SHAPE MODIFICATION

Steven J. Plummer, Hudson; Antoine Ina, Richmond Hts., both of Ohio; David L. Tipping, Northford, Conn., and Peter D. Esser, Smithtown, N.Y., assignors to Picker International, Inc., Highland Hts., Ohio

Filed Sep. 20, 1988, Ser. No. 246,675
Int. Cl.[4] G01T *1/166*
U.S. Cl. 250—363.04 **15 Claims**



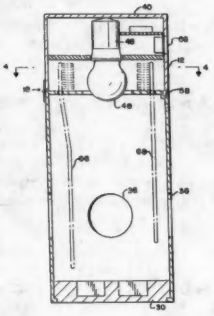
1. A tomographic camera system comprising:
a camera head for receiving radiation from a subject and producing output signals indicative thereof;
a gantry means for movably supporting the camera head for controlled movement about the subject;
a gantry control means for controlling movement of the camera head along a path of a selected size and a selected shape around the subject;
a path altering means for automatically altering the path shape in accordance with a characteristic of the subject; and,
a subject characteristic indicating means for indicating the subject characteristic.

4,888,487

TOOTHBRUSH STERILIZER WITH AUTOMATIC CONTROL

Charles H. Ritter, 3219 Thomasville Rd., #17A, Tallahassee, Fla. 32312

Continuation of Ser. No. 21,252, Mar. 3, 1987, Pat. No. 4,803,364. This application Feb. 6, 1989, Ser. No. 306,566
The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.
Int. Cl.[4] A61L *3/00*
U.S. Cl. 250—455.1 **27 Claims**



1. A toothbrush conditioning device, comprising:
(a) a body member having an upper end;
(b) a cover member;
(c) said cover member having a first orientation mounted to said upper end for forming with said cover member a conditioning chamber and a second orientation remote from said upper end for providing access to said body member;
(d) said body member including means for selectively positioning within the chamber a toothbrush to be conditioned;
(e) toothbrush conditioning means disposed proximate the toothbrush to be conditioned when said cover member is in said first orientation for sterilizing the toothbrush;
(f) control means operably associated with said conditioning means for causing automatic intermittent operation of said conditioning means when said cover member is in said first orientation; and
(g) switch means operably associated with said cover member, said body member and said control means for permitting operation of said control means and said conditioning means when said cover member is in said first orientation and for preventing operation thereof when said cover member is in said second orientation.

4,888,488

EXPOSING APPARATUS USED IN FABRICATION OF PRINTED CIRCUIT BOARDS

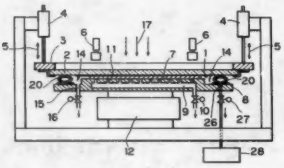
Eiichi Miyake, D3-304, 7 Shinsenriminami-machi 3-chome, Toyonaka-shi, Osaka, Japan

Filed Nov. 22, 1988, Ser. No. 274,439

Claims priority, application Japan, Mar. 15, 1988, 63-34942[U]

Int. Cl.[4] G03B *27/04*

U.S. Cl. 250—492.1 5 Claims



1. An exposing apparatus comprising: means for holding an original;

means for holding a material to be exposed so that said material is parallel to said original;

packing means of elastic material having a thickness dimension and arranged so that a space defined between said original and said material is peripherally sealed by compressing said packing means in the direction of the thickness;

said packing means being of hollow construction having a cavity and designed so that said thickness dimension can be changed by changing the internal pressure in said cavity;

pressure control means for changing the internal pressure in said cavity;

means for imparting a vacuum to said space which is sealed by said packing means and which is defined between said original and said material to be exposed, whereby said original and said material to be exposed are intimately contacted with each other.

4,888,489

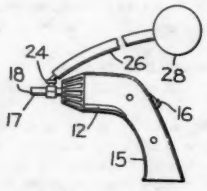
HAND-HELD DEVICE FOR CURING A DENTAL RESTORATIVE MATERIAL

Thomas T. Bryan, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 9, 1988, Ser. No. 191,911

Int. Cl.[4] A61C *13/14*

U.S. Cl. 250—504 H 12 Claims



1. A hand-held device useful for curing a photocurable restorative material, said device comprising

means for directing radiant energy of a wavelength that cures said material along a direction toward the restorative material, and

means for directing a gentle flow of inert gas in substantially the same direction as the radiant energy is directed as said radiant energy is directed toward said restorative material, whereby said gas blows across said restorative material.

4,888,490

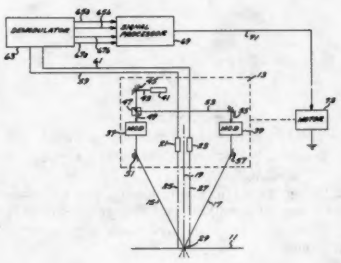
OPTICAL PROXIMITY APPARATUS AND METHOD USING LIGHT SOURCES BEING MODULATED AT DIFFERENT FREQUENCIES

Michael Bass, Winter Springs, Fla., and Stephen M. Copley, Palos Verdes Estates, Calif., assignors to University of Southern California, Los Angeles, Calif.

Filed May 24, 1988, Ser. No. 197,854

Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—561 19 Claims



1. Optical proximity apparatus for monitoring the spatial proximity of a surface, comprising:

first source means for providing a first beam of light modulated at a first frequency;

second source means for providing a second beam of light modulated at a second frequency, different from the first frequency;

optical means for directing the first and second modulated beams of light simultaneously at a surface whose spatial proximity is to be monitored, wherein the beams are coplanar and converge toward each other, from opposite sides of a central axis, and wherein the beams both reach the central axis at a desired position of the surface;

photodetector means for detecting light scattered from the surface along a first detection axis parallel with the central axis and in the same plane as the first and second modulated beams of light, and for producing a corresponding first detection signal;

demodulator means for demodulating the first detection signal, to determine the relative strengths of the first and second modulated beams of light in the light detected by the photodetector means along the first detection axis; and

processor means, responsive to the relative strength determination made by the demodulator means, for determining the proximity of the surface relative to the optical means.

4,888,491

DEVICE FOR MEASURING ANGULAR DEVIATION OF FLAT PLATE

Masaki Kobayashi, and Minemasa Ohta, both of Yamanashi, Japan, assignors to Pioneer Electronic Corporation, Tokyo and Pioneer Video Corporation, Yamanashi, both of, Japan

Filed May 26, 1988, Ser. No. 200,105

Claims priority, application Japan, Jul. 28, 1987, 62-188635

Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—561 12 Claims

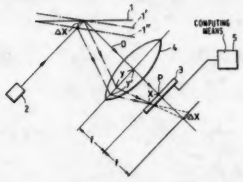
1. A device for measuring an angular deviation of a flat plate from a reference position thereof, comprising:

a light source for emitting a light beam which is obliquely made incident on said flat plate;

a convex lens located across an optical axis of a light beam

reflected from said flat plate in said reference position, for refracting said reflected light beam;

a position detector whose light-receiving surface is located in a focal plane of said convex lens, for generating a output electric signal corresponding to an incidence position of



said reflected light beam on said light-receiving surface of said position detector; and

computing means for calculating said angular deviation of said flat plate on the basis of said output electric signal provided from said position detector.

4,888,492

IMAGE READING APPARATUS

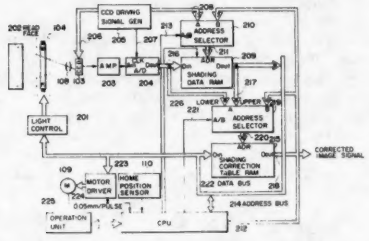
Shinobu Arimoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 29, 1988, Ser. No. 162,302

Claims priority, application Japan, Mar. 3, 1987, 62-47962; Mar. 3, 1987, 62-47966

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 **21 Claims**



1. An image reading apparatus comprising:

reading means for photoelectrically reading an original image and generating an image signal;

a reference member for use in the measurement of fluctuations in the output of said reading means;

detecting means for detecting a ratio of the output of said reading means obtained by reading a reference document having a predetermined reference density to the output of said reading means obtained by reading said reference member; and

correcting means for correcting the fluctuation of an image signal obtained by reading an original document with said reading means, utilizing the output signal obtained by reading said reference member with said reading means;

wherein said correcting means is adapted to correct the fluctuation in the image signal taking into account the ratio detected by said detecting means.

4,888,493

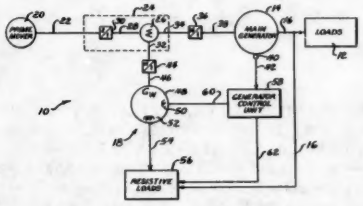
SPEED TRIMMING INTEGRATED DRIVE GENERATOR

Theodore D. Fluegel, Waltham, Mass., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Aug. 24, 1988, Ser. No. 235,609

Int. Cl.[4] H02P *9/42*

U.S. Cl. 290—4 C **16 Claims**



1. A compensated constant speed drive for developing constant speed motive power from variable speed motive power developed at an output shaft of a prime mover, comprising:

a speed summer having an input shaft, a compensation shaft and an output shaft at which the constant speed motive power is developed, the input shaft being coupled to the prime mover output shaft;

means for generating a signal representing speed of the speed summer output shaft;

a dynamoelectric machine including a motive power shaft coupled to the compensation shaft of the speed summer and also including electrical power windings;

a plurality of resistive loads; and

means coupled to said generating means and said resistive loads for selectively connecting said resistive loads to said electrical power windings so that the dynamoelectric machine develops compensating speed of a magnitude sufficient to maintain said speed summer output shaft at the desired speed.

4,888,494

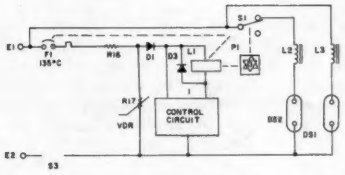
ELECTROMECHANICAL LAMP SWITCHING

Rhett McNair, 1200 N. Van Buren, Anaheim, Calif. 92807, and Martin E. G. Willcocks, 6321 W. 78th Pl., Los Angeles, Calif. 90045

Filed Nov. 2, 1987, Ser. No. 115,912

Int. Cl.[4] H05B *37/00*

U.S. Cl. 307—38 **24 Claims**



1. Apparatus for selectively illuminating first lamp means or first and second lamp means comprising a first circuit having terminals for connecting to a supply line from a wall switch and being connected to the first lamp means for turning the first lamp means on every time the wall switch supplies power to the terminals and the first circuit, a second circuit, the second lamp means connected to the second circuit, a first switching means connected between the second circuit and the first circuit for alternately connecting the second circuit with and disconnecting it from the first circuit, an operating means

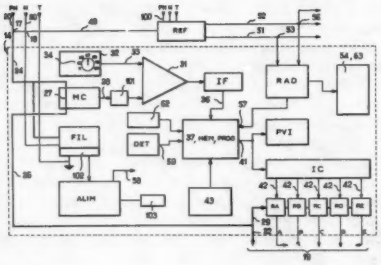
mechanically connected to the first switching means for changing the condition of the first switching means upon each operation of the operating means, control means electrically connected to the first circuit and to the operating means for moving the operating means upon each energization of the first circuit.

4,888,495

POWER ADAPTER FOR ELECTRICAL INSTALLATIONS AND ESPECIALLY DOMESTIC INSTALLATIONS WITH SO-CALLED CARRIER CURRENT CONTROL

Paul Feron, Toulouse, and Daniel Tougne, Cahors, both of France, assignors to Manufacture d'Appareillage Electrique Cahors, Cahors and Electricite de France, Toulouse, both of, France

Filed Jun. 22, 1987, Ser. No. 64,588
Claims priority, application France, Jun. 20, 1986, 86 08914
Int. Cl.[4] H02J *13/00;* **H04M** *11/04*
U.S. Cl. 307—39 **2 Claims**



1. A power adapter comprising:

a power input,

a power output adapted to be connected in use to a plurality of power consumption points,

means for detecting the current through the power input,

means for comparing said current with a threshold,

means for successively disconnecting power consumption points of said plurality in a pre-established order when said current is higher than said threshold and then successively re-connecting said disconnected power consumption points in the reverse of said pre-established order when said current is lower than said threshold,

programming means for programming said pre-established order and for selectively assigning an erasure permission to at least one power consumption point from said plurality independently of said pre-established order,

input means of receiving a signal representing an external condition,

erasing means responsive to said signal for selectively disconnecting said at least one power consumption point upon detection of a predetermined condition of said signal, and

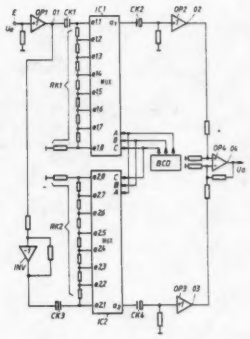
a transmitting circuit which is responsive to the means for successively disconnecting and to the erasing means, for delivering at the power output control signals to which receiving devices are selectively responsive in order to interrupt or restore the supply of current to at least a predetermined number of power consumption points, said receiving devices being connected in series with said points and upstream of these latter.

4,888,496

CIRCUITRY FOR ADJUSTING THE AMPLITUDE OF ANALOG SIGNALS

Friedrich Schmitz, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Fed. Rep. of Germany

Filed Sep. 7, 1988, Ser. No. 240,910
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1987, 3731643
Int. Cl.[4] H03K *5/02, 5/08, 17/16*
U.S. Cl. 307—264 **6 Claims**



1. In circuitry, for controlling the amplitude of an analog signal, of the type including a tapped impedance to which an analog input signal is applied, and a first multiplexer having a plurality of input terminals coupled to respective ones of taps of said tapped impedance, said first multiplexer responsive to control signals for selectively coupling ones of its input terminals to an output terminal thereof to provide an amplitude controlled signal, said circuitry including an improvement comprising:

means for subtractively combining two signals having a first input terminal coupled to the output terminal of said first multiplexer, having a second input terminal, and an output terminal for providing amplitude controlled signal;

a second multiplexer similar to said first multiplexer, having an output terminal coupled to said second input terminal of said means for subtractively combining two signals, said second multiplexer responsive to said control signals for selectively coupling one of its input terminals to its output terminal in like manner to said first multiplexer.

4,888,497

GENERATOR OF RESET PULSES UPON THE RISE OF THE POWER SUPPLY FOR CMOS-TYPE INTEGRATED CIRCUITS

Marco Dallabora, Melegnano; Roberto Gastaldi, Milan, both of Italy, and David Novosel, New Wilmington, Pa., assignors to SGS Thomson Microelectronics spa, Catania, Italy

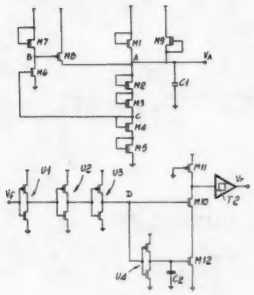
Filed Apr. 28, 1988, Ser. No. 187,581
Claims priority, application Italy, May 7, 1987, 20420 A/87
Int. Cl.[4] H03K *17/22, 17/20, 17/687, 5/153*
U.S. Cl. 307—272.3 **9 Claims**

1. A power-on reset circuit comprising:

an input stage including a voltage divider means coupled across a power supply and having a node defining the output of the input stage and a feedback node coupled to said output node through a positive feedback threshold loop for providing a rise of voltage at said output node when the voltage at said feedback node exceeds a predetermined threshold,

a first trigger circuit driven from the output of the input stage, and

a pulse generator comprising an input circuit means and a second trigger circuit driven from said input circuit means, the circuit means coupling the signal from the first trigger circuit to restore the original voltage level,



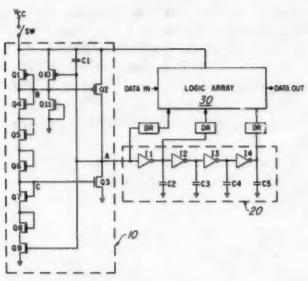
wherein said positive feedback loop includes a pair of transistors one of which is a P-channel transistor.

4,888,498

INTEGRATED-CIRCUIT POWER-UP PULSE GENERATOR CIRCUIT

Shailesh R. Kadakia, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 24, 1988, Ser. No. 172,532
Int. Cl.[4] G11C *11/00;* **H03K** *3/01*
U.S. Cl. 307—296.4 **9 Claims**



1. A pulse-generating circuit comprising:

a diode-stack-charging transistor of a first conductivity type having source-drain path connected between a power input terminal and the upper terminal of a diode stack and having gate terminal connected to said upper terminal of said diode stack;

a diode stack comprising a plurality of transistors of a second conductivity type with source-drain paths connected in series between said upper terminal of said diode stack and a source of reference potential, with gate terminal connected to the drain terminal of each of said plurality of transistors, and with a diode-stack tap terminal at a common source-drain terminal of said plurality of transistors;

a first pulse-control transistor of first conductivity type with source-drain path connected between said power input terminal and said output terminal of said pulse-generating circuit and with gate terminal connected to said upper terminal of said diode stack;

a second pulse-control transistor of second conductivity type with source-drain path connected between said output terminal of said pulse-generating circuit and said source of reference potential and with gate terminal connected to said diode-stack tap terminal;

a bias transistor of first conductivity type with source-drain path connected between said power input terminal and said upper terminal of said diode stack and with gate terminal connected to said output terminal of said pulse-generating circuit; and

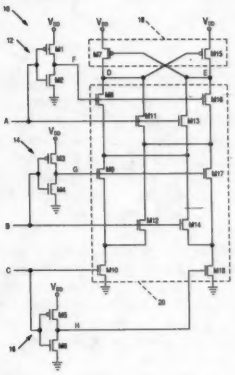
a pulse-control capacitor connected between said power input terminal and said output terminal of said pulse-generating circuit.

4,888,499

THREE INPUT EXCLUSIVE OR-NOR GATE CIRCUIT

Ikuo J. Sanwo, San Marcos, and Gregory H. Milby, San Diego, both of Calif., assignors to NCR corporation, Dayton, Ohio

Filed Oct. 19, 1988, Ser. No. 259,942
Int. Cl.[4] H03K *19/017, 19/096, 19/20*
U.S. Cl. 307—471 **15 Claims**



1. A three input Exclusive OR-NOR gate circuit comprising:

first, second and third inverters each having an input for receiving one of three logical input signals and an output for providing an output signal which is an inverted input signal;

a power potential terminal;

a reference potential terminal;

an Exclusive NOR output node for receiving a signal from one of said terminals and an Exclusive OR output node for receiving a signal from the other terminal;

first and second PMOS transistors connected between said power potential terminal and said Exclusive NOR and Exclusive OR output nodes, and responsive to the signals on said Exclusive OR and Exclusive NOR output nodes, respectively;

first, second and third NMOS transistors connected between said Exclusive NOR output node and said reference potential terminal;

fourth, fifth and sixth NMOS transistors connected between said Exclusive OR output node and said reference potential terminal;

seventh and eighth NMOS transistors connected between said Exclusive NOR output node and said third NMOS transistor; and

ninth and tenth NMOS transistors connected between said Exclusive OR output node and said sixth NMOS transistor;

wherein said first, second, fourth, fifth and sixth NMOS transistors are responsive to said inverted input signals, and said third, seventh, eighth, ninth and tenth NMOS transistors are responsive to said input signals.

4,888,500

TTL-COMPATIBLE CELL FOR CMOS INTEGRATED CIRCUITS

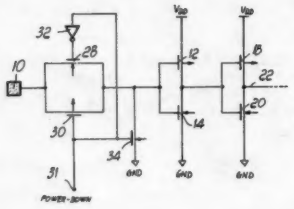
Germano Nicollini, Piacenza, and Pierangelo Confalonieri, Canonica D'Adda, both of Italy, assignors to SGS Thomson Microelectronics spa, Catania, Italy

Filed Mar. 23, 1988, Ser. No. 171,954

Claims priority, application Italy, Mar. 30, 1987, 19896 A/87

Int. Cl.[4] H03K *19/092, 3/01, 19/094*

U.S. Cl. 307—475 **3 Claims**



1. TTL-compatible cell for CMOS integrated circuits, associated with an input pin of the integrated circuit to make it suitable for receiving signals in TTL logic, comprising:

a first P-channel transistor and a second N-channel transistor, the drain of the P-channel transistor being connected to the source of the N-channel transistor and to said input pin, the source of the P-channel transistor being connected to the drain of the N-channel transistor and defining a common output;

a power-down pin controlling the gate of said first P-channel transistor and controlling the gate of said second N-channel transistor through a first inverter, so as to turn said first and second transistors off when the power-down signal is at "logical 1" and to activate said first and said second transistors when the power-down signal is at "logical 0";

a further MOS transistor, interposed between said common output and the ground, the drain thereof being connected to said output, the source thereof being grounded and the gate of said further MOS transistor being driven by said power-down pin, so as to be active when said power-down signal is at "logical1" and off when said power-down signal is at "logical 0"; and

two further serially coupled inverters, each inverter comprising a third P-channel transistor and a fourth N-channel transistor, the gates thereof being mutually coupled to form an inverter input, the drain of said fourth transistor being connected to the source of said third transistor to form an inverter output, the drain of said third transistor being connected to a reference voltage line and the source of said fourth transistor being grounded, the inverter input of the first of said further inverters being connected to said common output.

4,888,501

ECL TO CMOS CONVERTER

Ikuo J. Sanwo, San Marcos; John D. Simeral, San Diego, and Richard A. Daniel, Escondido, all of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Oct. 19, 1988, Ser. No. 259,838

Int. Cl.[4] H03K *19/02, 19/092, 5/12*

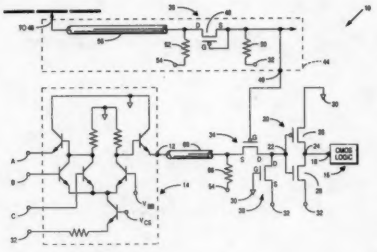
U.S. Cl. 307—475 **22 Claims**

1. An ECL to CMOS converter for converting high or low ECL logic signals appearing at the output of an ECL circuit comprising:

a CMOS inverter for providing low or high CMOS logic signals at its output in response to a first or second signal, respectively, applied to its input, wherein said first signal must exceed a first predetermined value and said second signal must fall below a second predetermined value, and wherein said low ECL signal does not fall below said second predetermined value; and

means for converting said high and low ECL logic signals to said first and second signals, respectively, wherein said converting means includes:

a transfer gate connecting said ECL circuit output to said CMOS inverter input;



a control circuit for providing at an output thereof a control voltage which varies proportionally with changes in said ECL logic signals, wherein said control circuit output is connected to the control electrode of said transfer gate; and

resistive means connected between said CMOS inverter input and a first power supply terminal which provides a first CMOS reference voltage.

4,888,502

VARIABLE BANDWIDTH FILTER

Adrian E. Jarrett, Surrey, England, assignor to Plessey Overseas Limited, Ilford, England

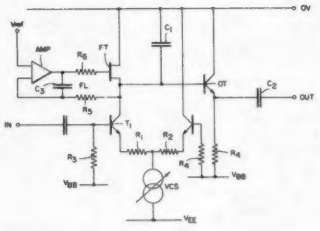
PCT No. PCT/GB87/00247, § 371 Date Feb. 1, 1988, § 102(e) Date Feb. 1, 1988, PCT Pub. No. WO87/06406, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 10, 1987, Ser. No. 137,533

Claims priority, application United Kingdom, Apr. 11, 1986, 8608875

Int. Cl.[4] H03K *5/00;* **H03F** *3/26*

U.S. Cl. 307—520 **6 Claims**



1. A variable bandwidth filter comprising a filter input circuit including capacitive means connected to the base of a first transistor of a pair of matched transistors having their emitters coupled together and provided with a common emitter circuit including a variable current source, a filter output circuit including capacitive means connected to the collector of the first transistor, a field effect transistor which is connected in the collector circuit of the first transistor and which serves as a variable collector load resistor, capacitive means connected across the field effect transistor and a control loop arrangement extending from the collector of the first transistor to the gate of the field effect transistor to provide a control voltage at

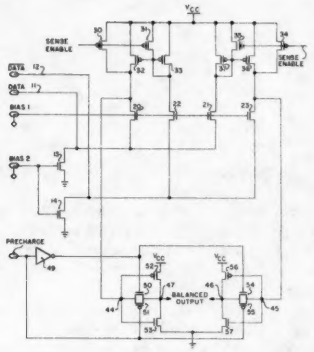
the gate of the field effect transistor to maintain constant the DC voltage across the field effect transistor whereby the effective bandwidth of the filter defined by the field effect transistor and capacitive means in the collector circuit of the first transistor is controllable in dependence upon the current flowing in the common emitter circuit of the matched transistors.

4,888,503

CONSTANT CURRENT BIASED COMMON GATE DIFFERENTIAL SENSE AMPLIFIER

Ian A. Young, Portland, Oreg., assignor to Intel Corporation, Santa Clara, Calif.

Filed Oct. 13, 1987, Ser. No. 107,179
Int. Cl.[4] A03K 5/24; G11C 7/06
U.S. Cl. 307—530 **20 Claims**



1. A FET sense amplifier for sensing a pair of data lines coupled to a memory comprising:

a first and second common gate transistors of a first conductivity type, wherein an input terminal of said first transistor is coupled to a first of said data lines and an input terminal of said second transistor is coupled to a second of said pair of data lines;

a third and fourth common gate transistors of said first conductivity type, wherein an input terminal of said third transistor is coupled to said first date line and a input terminal of said fourth transistor is coupled to said second data line;

said first, second, third and fourth common gate transistors having their gates coupled together to a first reference voltage source;

a fifth and sixth transistors having their gates coupled to a second reference voltage source, wherein one terminal of said fifth transistor is coupled to said first data line and said input terminals of said first and third transistors;

and one terminal of said sixth transistor is coupled to said second data line and said input terminals of said second and fourth transistors;

a first active load coupled to output terminals of said first and second transistors;

a second active load coupled to output terminals of said third and fourth transistors;

said first reference voltage source biasing gates of said fifth and sixth transistors to operate in a saturation region;

said second reference voltage source biasing said first, second, third and fourth transistors, wherein these four said common gate transistors conduct to bias said one terminals of said fifth and sixth transistors such that conduction of said four common gate transistors also biases said fifth and sixth transistors to operate in said saturation region;

said fifth and sixth transistors operating in said saturation region to function as a current source to said common gate transistors, wherein voltage changes on said data lines are compensated by said current source transistors to prevent signal loss;

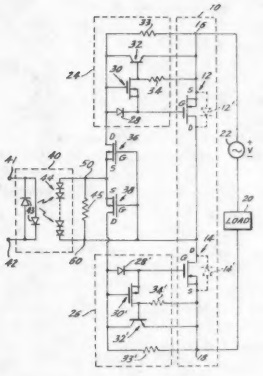
whereby an improved sense amplifier is achieved.

4,888,504

BIDIRECTIONAL MOSFET SWITCHING CIRCUIT WITH SINGLE GATE BIAS

Daniel M. Kinzer, El Segundo, Calif., assignor to International Rectifier Corporation, El Segundo, Calif.

Filed Oct. 7, 1988, Ser. No. 255,111
Int. Cl.[4] H03K 17/60, 17/687, 19/094, 3/01
U.S. Cl. 307—570 **12 Claims**



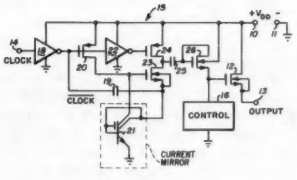
1. In combination with a bidirectional switching circuit including a pair of common-drain-connected power MOSFETs having their sources respectively connected to a pair of nodes for serial connection to a load-and-supply circuit and being of the source-to-base-shorted type, a gate control circuit for providing gate bias for both power MOSFETs from a single gate bias voltage respectively provided between first and second nodes, the gate control circuit comprising a pair of common-source-connected gate control MOSFETs with their sources connected to the first node; with their drains respectively connected to the respective gates of the pair of power MOSFETs; and with their gates connected in common to the second node and to the common-connected drains of the power MOSFETs.

4,888,505

VOLTAGE MULTIPLIER COMPATIBLE WITH A SELF-ISOLATED C/DMOS PROCESS

Timothy J. Skovmand, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 2, 1988, Ser. No. 189,442
Int. Cl.[4] H03K 17/687, 3/26
U.S. Cl. 307—571 **3 Claims**



1. A CMOS circuit having an output terminal and power

supply terminals connectable to an operating power supply, said circuit comprising:

a large area output transistor of a first conductivity type, having its source and drain electrodes coupled between said output terminal and one of said power supply terminals and having a gate electrode;

a source of clock pulse signals;

a current mirror having input and output terminals;

a first capacitor coupled between said source of clock pulse signals and said current mirror input;

a first transistor having said first conductivity type and having its source and backgate terminals coupled to said current mirror input, its gate terminal coupled to said current mirror output and having a drain terminal;

a second transistor having an opposite conductivity type and having its drain coupled to said gate of said first transistor, its source terminal returned to said one of said power supply terminals and its gate terminal coupled to said source of clock pulses;

a first inverter having an input coupled to said source of clock pulse and having an output terminal;

a third transistor having said opposite conductivity type and having its drain electrode coupled to said drain of said first transistor, its source electrode returned to said one of said power supply terminals and its gate terminal coupled to said first inverter output;

a second capacitor having a first terminal coupled to said drain of said first transistor and having a second terminal;

a fourth transistor having said first conductivity type and having its gate and drain terminals coupled to said second terminal of said second capacitor, its back gate coupled to said one of said power supply terminals and its source terminal coupled to said gate terminal of said large area output transistor whereby said gate of said large area output transistor is operable at a bias potential than can substantially exceed that of said operating power supply; and

means for controlling the magnitude of said bias potential.

4,888,506

VOICE COIL-TYPE LINEAR MOTOR

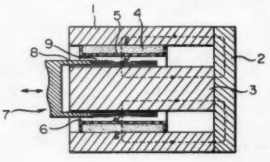
Teruo Umehara, Hanyu; Hiroyuki Daicho, and Seiki Taketomi, both of Kumagaya, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,042

Claims priority, application Japan, Jul. 9, 1987, 62-171899; Apr. 21, 1988, 63-53975[U]

Int. Cl.[4] 402K *41/02*

U.S. Cl. 310—13 **10 Claims**



1. A voice coil-type linear motor comprising an cylindrical outer yoke made of a ferromagnetic material; a cylindrical center yoke made of a ferromagnetic material and magnetically coupled with said outer yoke; a circumferentially integral, cylindrical magnet consisting essentially of an R-B-Fe alloy wherein R is at least one of the rare earth metals such as Nd, Pr and Dy and having magnetic anisotropy in a radial direction, said cylindrical magnet being fixed to an inner surface of said outer yoke; a movable coil means arranged in a magnetic gap between said center yoke and said cylindrical magnet; and combined means for protecting said cylindrical magnet against physical contact-induced cracking and for compensating for the variation in inductance of said movable coil means during motor operation.

4,888,507

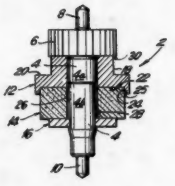
STEPPING MOTOR ROTOR ASSEMBLY FOR AN ELECTRONIC TIMEPIECE

Michel Plancon, Besancon, and Michel Bertrix, Saint Vit, both of France, assignors to Timex Corporation, Waterbury, Conn.

Filed Oct. 27, 1988, Ser. No. 263,319

Int. Cl.[4] H02K *15/02, 37/14*

U.S. Cl. 310—40 MM **7 Claims**



1. A rotor assembly for a stepping motor comprising:

a rotor having a shaft and driving member,

a centering washer disposed on said shaft and having a side thereof opposite and said driving member defining a recess having a finished cylindrical wall portion coaxial with said shaft and defining a first annular abutment surface at the bottom of said recess,

a substantially cylindrical rare earth permanent magnet having a rough center hole defining an annular clearance with said shaft and having a finished outer wall portion extending only a portion of its axial length into said recess with a loose fit and contacting said first annular surface,

a holding washer having a center hole forming an interference fit with said shaft and pressed onto said shaft to force said magnet axially against the first abutment surface, and

means restraining axial movement of said centering washer on said shaft, wherein said axial movement restraining means comprises said drive member and said centering washer abuts said driving member so as to restrain the centering washer axially on the shaft, whereby said washers hold the magnet in position on said rotor shaft and whereby said cylindrical wall portion of the recess centers the magnet radially with respect to the shaft axis.

4,888,508

DEVICE AND PROCEDURE TO ADJUST THE AXIAL PLAY BETWEEN THE ROTOR AND THE STATOR MOUNTED BEARINGS OF AN ELECTRICAL MOTOR

Peter Adam, Hoechberg; Adolf Lindner, Rottendorf; Werner Schilling, and Ewald Wehner, both of Wuerzburg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 24, 1985, Ser. No. 779,727

Claims priority, application European Pat. Off., Sep. 24, 1984, 84111370.7

Int. Cl.[4] H02K *15/00*

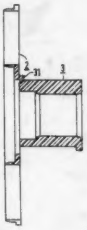
U.S. Cl. 310—42 **4 Claims**

1. A unitary component for use in electrical motors of the type in which the rotor shaft supports a rotor core and is supported by bearings mounted on the stator housing, comprising;

an insulated end disk dimensioned for attachment to the rotor core;

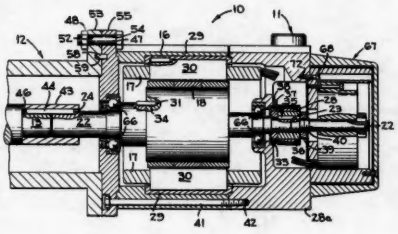
a spacer sleeve dimensioned to press-fit onto the rotor shaft; and

a break-away region connecting the disk and the sleeve in such a manner that the sleeve moves towards the disk



when the region is broken by axially directed pressure applied to the sleeve;
and the disk, sleeve and region being a unitary molded part.

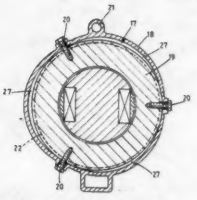
4,888,509
BRUSHLESS SERVO MOTOR CONSTRUCTION AND ALIGNMENT
Jaroslav Tomasek, 10024 S. Shore Dr., Plymouth, Minn. 55441
Filed Feb. 5, 1988, Ser. No. 152,728
Int. Cl.[4] H02K *15/00*
U.S. Cl. 310—42 **6 Claims**



1. In a brushless servo motor having means for providing accurate and repeatable correlation between the rotational position of a rotatable shaft couplable to a load and feedback signals from a rotational position sensor, said motor having a plurality of components including:
- a rotor having a rotatable shaft with a plurality of magnets mounted thereon,
- a stator surrounding said rotor and having a plurality of windings mounted thereabout,
- a motor housing receiving said stator and said windings, and
- a position sensor having a rotor and a stator for developing motor rotor position feedback signals,

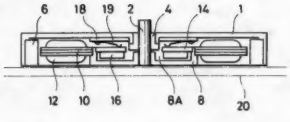
the improvement wherein said motor further has:
- means (29) for a defined positioning of said stator windings (17) about said motor housing;
- means (31) for a defined positioning of said magnets (18) on said rotatable shaft (22);
- means (35) for a defined angular orientation of said position sensor rotor relative to said magnets (18);
- means (37) for a defined positioning of said sensor stator (28) relative to said motor housing (16),
- means (44) for repeatably orienting said rotatable motor shaft (22) in a predetermined angular position relative to a load shaft; and
- means (58) for orienting said motor housing in a predetermined angular position relative to a stationary portion (53) of a load,
- whereby said respective positioning and orienting means causes a defined reference value of said position sensor feedback signal to correspond to a defined angular relationship between said motor shaft (22) and said motor housing (16), and whereby further, replacement of said motor or any of said components thereof with positioning and orientation thereof by said respective means will produce a repeatable said sensor/shaft signal in operation of said servo motor.

4,888,510
ROTARY ELECTRIC MACHINE
Peter Hunt, Hemel Hempstead, England, assignor to Lucas Industries, Inc., Birmingham, England
Filed Jan. 11, 1989, Ser. No. 295,541
Claims priority, application United Kingdom, Jan. 14, 1988, 8800813
Int. Cl.[4] H02K *5/12, 9/00*
U.S. Cl. 310—54 **18 Claims**



1. A rotary electric matching comprising a stator, a rotor rotatable relative to said stator, a structure for supporting said stator, said stator and said structure having adjacent inner and outer surfaces, and means for preventing relative rotation or axial movement between said stator and said structure, port means for introducing a fluid coolant under pressure to said surface of the stator intermediate the ends thereof, the materials of said structure and said stator having different thermal coefficients of expansion, the dimensions of said stator and said structure, normal to the axis of rotation of said rotor, being such as to provide an interference fit between said surfaces below a predetermined temperature level, and a clearance fit above that level, said clearance fit defining channels through which coolant can flow from said port means over said stator surface.

4,888,511
MOTOR
Kanemasa Aoki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan
Filed Jul. 12, 1988, Ser. No. 217,867
Claims priority, application Japan, Jul. 21, 1987, 62-181705
Int. Cl.[4] H02K *13/04*
U.S. Cl. 310—237 **3 Claims**



1. A motor comprising:
- a motor case having a bearing rotatably supporting a rotary shaft, and formed with a cylindrical portion at an external periphery portion of the motor case;
- a field magnet attached to and inside of said cylindrical portion of the motor case;
- a cup-shaped yoke member fixed to said rotary shaft;

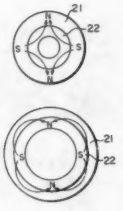
an iron core fixed to an external periphery of said cup-shaped yoke member;
a coil wound around said iron core;
a commutator having divided commutator portions on a plane, said commutator portions being mounted and fixed to said cup-shaped yoke member inside said external periphery portion, and connected to said coil; and
current supply means having brushes in contact with said commutator portions and terminals for supplying current to said brushes, said terminals being fixed to a resin member embedded in an aperture formed on said motor.

4,888,512

SURFACE MULTIPOLAR RARE EARTH-IRON-BORON ROTOR MAGNET AND METHOD OF MAKING

Motoharu Shimizu, Kumagaya, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

Filed Apr. 6, 1988, Ser. No. 178,212
Claims priority, application Japan, Apr. 7, 1987, 62-85531; Dec. 21, 1987, 62-323347
Int. Cl.[4] H02K *21/06*; H01F *7/02*; C22C *75/246*
U.S. Cl. 310—156 **16 Claims**



1. A cylindrical permanent magnet containing, as major components, R (R is at least one rare earth element selected from Nd, Pr, DY, Ho and Tb and may further contain at least one rare earth element selected from La, Ce, Sm, Gd, Er, Eu, Tm, Yb and Y), b and Fe, and having circumferential multipolar anisotrophy at a cylindrical surface, said major components being present in amounts of 10 to 30 atomic % of R, 2 to 28 atomic % of B, and 65 to 80 atomic % of Fe, wherein the number of magnetic poles (P) is 4 to 8; and wherein the inner diameter (D_1) and the outer diameter (D_2) have the relationship represented by the following formulas (1) to (3):

$$p=4:D_1/D_2=0.35 \text{ to } 0.85 \quad (1),$$

$$p=6:D_1/D_2=0.45 \text{ to } 0.85 \quad (2),$$

and

$$p=8:D_1/D_2=0.55 \text{ to } 0.85 \quad (3).$$

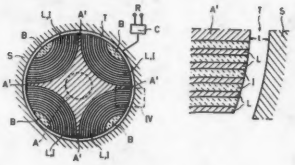
4,888,513

RELUCTANCE ELECTRIC MACHINE HAVING A DECREASED CROSS SECTION OF ROTOR FERROMAGNETIC MATERIAL

Antonino Fratta, Via Levanna 27, I-10143, Torino, Italy

Filed Apr. 19, 1988, Ser. No. 186,091
Claims priority, application Italy, Apr. 30, 1987, 67374 A/87
Int. Cl.[4] H02K *19/06*
U.S. Cl. 310—216 **6 Claims**

1. A reluctance electric machine comprising
(a) a stator having electric windings; and
(b) a rotor having spaced poles and being inserted into said stator and spaced therefrom by an air gap, said rotor including axial laminations comprising
(1) ferromagnetic sheets; and
(2) non-ferromagnetic intercalary layers alternating with said ferromagnetic sheets in such a way that the cross section of said ferromagnetic sheets of said rotor at least in the vicinity of said air gap is decreased by said non-ferromagnetic intercalary layers, the ratio between the cross section of said ferromagnetic sheets and the cross section available for magnetic flux lines not exceeding



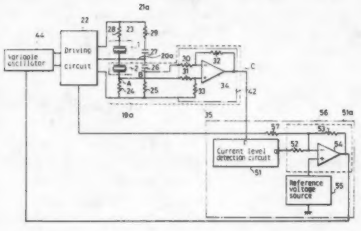
0.6, the thickness of each of said intercalary layers being at least $\frac{1}{3}$ of the thickness of each of said ferromagnetic sheets, and the thickness of each of said intercalary layers not exceeding 5 times the thickness of said air gap.

4,888,514

DRIVING APPARATUS FOR ULTRASONIC MOTOR

Ken-ichiroh Takahashi, Katano; Ritsuo Inaba, Neyagawa; Nobukazu Sugano, Suita; Horiyuki Harao, Ikoma; Yukihiro Matsuyama, Hirakata; Hiromi Tanoue, Kadoma, and Toru Kishi, Yamatokouriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 13, 1988, Ser. No. 260,505
Claims priority, application Japan, Oct. 16, 1987, 62-262115; Oct. 16, 1987, 62-262116
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—316 **9 Claims**



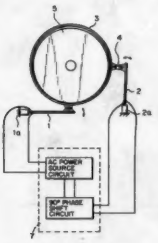
1. A driving apparatus for ultrasonic motor comprising:
current detection means for detecting current which flows in a piezoelectric member in proportion to mechanical vibration of said piezoelectric member;
current level detection means for detecting current level of output signal of said current detection means and comparing said current level with reference voltage of a reference voltage source;
a variable oscillator for variably oscillating frequency responding to output signal of said current level detection means to keep said current substantially constant; and
a driving circuit for supplying driving voltage based on said oscillating frequency to said piezoelectric member.

4,888,515

ROTARY POWER UNIT

Shuichi Tamura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 942,618, Dec. 17, 1986, abandoned. This application Sep. 12, 1988, Ser. No. 243,214
Claims priority, application Japan, Dec. 25, 1985, 60-295309
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—323 5 Claims



1. A rotary power unit comprising:

a rotatably supported rotary disk having an outer diameter;

a driving ring having an inner diameter greater than the outer diameter of said disk and being provided so as to surround said disk, with a portion of an inner periphery of said ring being able to contact a portion of an outer periphery of said disk;

a first piezoelectric member having a first end fixedly secured and a second end operatively engaged to a first portion on an outer periphery of said ring, said first piezoelectric member oscillating in response to a first alternating signal so that a first point on the inner periphery of said ring contacts the outer periphery of said disk; and

a second piezoelectric member having one end fixedly secured and a second end operatively engaged with a second portion on the outer periphery of said ring, with the second portion spaced from the first portion by approximately 90° around a perimeter of said ring, said second piezoelectric member oscillating in response to a second alternating signal having a 90° phase difference from the first alternating signal so that a second point on the inner periphery of said ring contacts the outer periphery of said disk.

4,888,516

PIEZOELECTRICALLY EXCITABLE RESONANCE SYSTEM

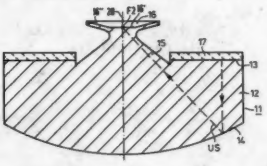
Johannes Daeges, Lichtenfels, and Klaus Van Der Linden, Kronach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 21, 1988, Ser. No. 222,266
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 3724629
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—323 12 Claims

1. A piezoelectrically excitable resonance system for atomizing a liquid, comprising:

a metal body with rotational symmetry and capable of vibrating, said body including a disc-shaped base plate having a parabolic surface with a focal point, a working plate disposed at least in the vicinity of said focal point for holding said liquid, and a neck connecting the working plate to the base plate; and

a piezoceramic vibrator which is coupled to a plane base surface of the base plate perpendicular to the axis of symmetry, said piezoceramic vibrator operating as a thickness resonance vibrator.

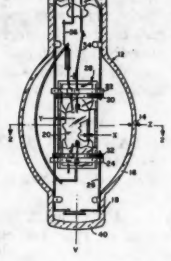


4,888,517

DOUBLE-ENVELOPED LAMP HAVING A SHIELD SURROUNDING A LIGHT-SOURCE CAPSULE WITHIN A THICK-WALLED OUTER ENVELOPE

William M. Keeffe, Rockport, Mass.; Robert J. Karlotski, Weare, N.H.; Joseph S. Kulik, Allenstown, N.H., and Simone P. Bazin, Bedford, N.H., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 90,983, Aug. 28, 1987, abandoned. This application May 5, 1989, Ser. No. 351,286
Int. Cl.[4] H01J *61/34, 61/35, 61/50;* H01K *1/34*
U.S. Cl. 313—25 52 Claims



1. A higher-wattage double-enveloped electric lamp comprising:

(a) a light-transmissive outer envelope enclosing an interior, said outer envelope having a minimum wall thickness greater than one millimeter;

(b) a light-source capsule mounted within said outer envelope, said light-source capsule having an operating wattage which is equal to or greater than one hundred and seventy-five watts, said light-source capsule being subject to burst on rare occasions;

(c) means for shielding said outer envelope by absorbing and dissipating a portion of the energy of a burst of said light-source capsule, said shielding means including a light-transmissive shield mounted within said outer envelope, said shield substantially surrounding said light-source capsule; and

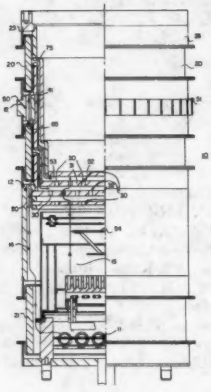
(d) means within said lamp for providing electrical power from an external source to said light-source capsule and for mechanically completing said lamp;

(e) whereby said outer envelope will remain intact in the event of a burst of said light-source capsule and the performance of said lamp is improved.

4,888,518
GAS CIRCULATION APPARATUS FOR CERAMIC ELECTRON TUBES

Henry C. Grunwald, Bethlehem, Pa., assignor to ITT Corporation, New York, N.Y.

Filed Nov. 16, 1987, Ser. No. 122,304
Int. Cl.[4] H01J *1/46*
U.S. Cl. 313—40 20 Claims

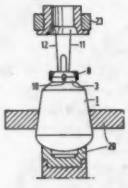


1. In a gas filled electron tube of the type having a ceramic envelope and having a planar grid, cathode and anode electrodes, the improvement in combination therewith comprising:
at least one annular surface radiator means associated with one of said electrodes and having on said surface a plurality of spaced apart apertures to provide a constant path cross section for neutral gas circulation within said tube about the main discharge path of said tube.

4,888,519
ELECTRIC LAMP AND METHOD OF MANUFACTURING SAME

Livio Borgis, S. Antonino, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 1,736, Jan. 9, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,108
Claims priority, application Italy, Jan. 10, 1986, 67018 A/86; Netherlands, Nov. 19, 1986, 8602928
Int. Cl.[4] H01J *5/48*
U.S. Cl. 313—318 8 Claims

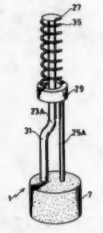


1. An electric lamp provided with:
a translucent lamp vessel having an axis and an end portion,
a light source in the lamp vessel,
a lamp cap having a sheath portion and a base portion in which said end portion of the lamp vessel is adhesively bound by means of a polyethersulfone synthetic resin member which member adheres both to the lamp vessel and to the lamp cap, said lamp cap having an electrical contact to which a current supply conductor to the light source is connected, characterized in that the synthetic resin member is positioned between said lamp cap and said end of the lamp vessel, contacts said end portion of the lamp vessel, and connects the end portion of the lamp vessel to the lamp cap in directions transverse to said axis of the lamp vessel and in that the end portion of the lamp vessel has non-circular cross-sections transverse to said axis of the lamp vessel where it is in contact with the synthetic resin member.

4,888,520
MAGNETRON

Shingo Okamoto, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 3, 1987, Ser. No. 127,984
Claims priority, application Japan, Jan. 28, 1987, 62-16127
Int. Cl.[4] H01J *19/42*
U.S. Cl. 313—292 3 Claims



1. A magnetron comprising:
a stem;
a first rod having an end fixed to the stem and a free end;
a disk-shaped end hat fixed to the free end of the first rod;
a second rod having an end fixed to the stem and a free end, the first rod being larger in diameter and longer than the second rod;
a cylindrical end hat fixed to the free end of the second rod, said first rod passing through said cylindrical end hat,; and
a filament connected between the disk-shaped and cylindrical end hats, wherein the independent natural frequency of a first vibration system composed of the first rod and the disk-shaped end hat is substantially equal to the independent natural frequency of a second vibration system composed of the second rod and the cylindrical end hat.

4,888,521

PHOTOCONDUCTIVE DEVICE AND METHOD OF OPERATING THE SAME

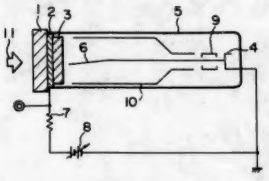
Kenkichi Tanioka, Tokyo; Keiichi Shidara; Tatsuro Kawamura, both of Tama; Junichi Yamazaki, Kawasaki; Eikyuu Hiruma, Komae; Kazuhisa Taketoshi, Sagamihara; Shiro Suzuki, Yokosuka; Takashi Yamashita, Sagamihara; Mitsuo Kosugi, Tokyo; Yoshizumi Ikeda, Tokyo; Masaaki Aiba, Tokyo; Tadaaki Hirai, Koganei; Yukio Takasaki, Kawasaki, all of Japan; Sachio Ishioka, Burlingame, Calif.; Tatsuo Makishima, Mitaka, Japan; Kenji Sameshima, Hachioji, Japan; Tsuyoshi Uda, Kodaira, Japan; Naohiro Goto, Machida, Japan; Yasuhiko Nonaka; Eisuke Inoue, both of Mobara, Japan; Kazutaka Tsuji, and Hirofumi Ogawa, both of Hachioji, Japan, assignors to Hitachi Ltd. and Nippon Hoso Kyokai, both of Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,156

Claims priority, application Japan, Jul. 4, 1986, 61-156317; Oct. 29, 1986, 61-255671; Oct. 29, 1986, 61-255672; Nov. 25, 1986, 61-278635; Jan. 14, 1987, 62-4865; Jan. 14, 1987, 62-4867; Jan. 14, 1987, 62-4869; Jan. 14, 1987, 62-4871; Jan. 14, 1987, 62-4872; Jan. 14, 1987, 62-4873; Jan. 17, 1987, 62-4875; Jun. 17, 1987, 62-149023

Int. Cl.[4] H01J *31/38*

U.S. Cl. 313—366 46 Claims



1. A photoconductive device having an image pick-up tube comprising:

a substrate;

an electrode formed on or above the substrate;

a photoconductive layer formed on or above the electrode, having an amorphous semiconductor layer which is capable of charge multiplication, and having a blocking type contact for preventing charge injection under an applied electric field which induces the charge multiplication in the amorphous semiconductor layer; and

a means for applying the electric field to the amorphous semiconductor layer so as to induce the charge multiplication in the amorphous semiconductor layer.

4,888,522

ELECTRICAL METHOD AND APPARATUS FOR IMPELLING THE EXTRUDED EJECTION OF HIGH-VELOCITY MATERIAL JETS

Richard C. Weingart, Livermore, Calif., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Apr. 27, 1988, Ser. No. 186,992

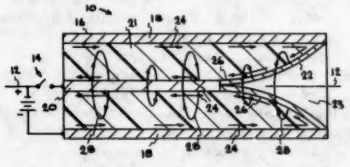
Int. Cl.[4] H01J *7/26;* H05H *5/00*

U.S. Cl. 315—111.61 10 Claims

1. An apparatus for producing a high-velocity material jet, the apparatus adapted to be driven by an externally supplied electric current pulse, said apparatus comprising:

a coaxial two-conductor transmission line that comprises an outer cylindrical conductor, an inner cylindrical conductor that has a common central axis therewith, and a solid plastic or ceramic insulator that completely fills the space between the inner cylindrical conductor and the outer cylindrical conductor, with the transmission line having a first end and a second end, and with the outer cylindrical conductor and the inner cylindrical conductor at the first end of the transmission line adapted to receive the externally supplied electric current pulse; and

a thin-walled metal structure attached or bonded to the solid plastic or ceramic insulator and conductively joining the outer conductor to the inner conductor at the second end of the transmission line, with the metal structure axisymmetric with respect to the common central axis and having a cavity that opens inwardly toward the interior of the transmission line;



whereby, when the externally supplied electric current pulse is received at the first end of the transmission line the metal structure collapses upon the cavity and impells the extruded ejection therefrom of said high-velocity material jet, with the jet comprised of a part of the metal that comprises the metal structure.

4,888,523

DRIVING CIRCUIT OF THIN MEMBRANE EL DISPLAY APPARATUS

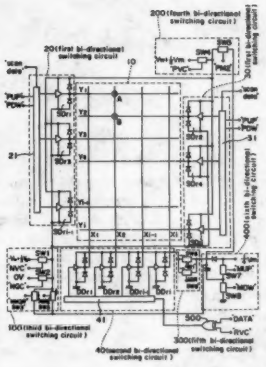
Kazuo Shoji; Yoshihide Fujioka; Shigeyuki Harada, and Toshihiro Ohba, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 76,219, Jul. 22, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 332,450

Claims priority, application Japan, Jul. 22, 1986, 61-173328; Jul. 29, 1986, 61-179626; Nov. 27, 1986, 61-283515

Int. Cl.[4] H01J *19/14*

U.S. Cl. 315—169.3 17 Claims



1. A driving circuit for an electroluminescent (EL) matrix display panel wherein an EL layer is disposed between orthogonally arranged scanning electrodes and the data electrodes, comprising:

a first switching circuit for selectively applying negative or positive-polarity driver output voltages to the scanning electrodes;

a second switching circuit for supplying charging and discharging modulation driver output voltages to the data electrodes;

said first and second switching circuits each including a

plurality of first, second high withstand-voltage drivers having push/pull functions, said drivers including
a high level drive voltage input,
a low level drive voltage input,
a single control voltage input,
each said driver selecting one of said drive voltage inputs for supply as said driver output voltage;
a third switching circuit for switching between a negative polarity writing voltage and 0V and connected with the low level drive voltage input of each said driver of said first switching circuit for pull down use of the first high withstand-voltage driver in the first switching circuit;
a fourth switching circuit for switching between a positive-polarity of writing voltage and 0V and connected with the high level drive voltage input of each said driver of said first switching circuit for pull up use;
the low level drive voltage input of each said driver of said second switching circuit being for pull down use and being connected with 0V; and
a fifth switching circuit for switching the high level drive voltage input of said second switching circuit between a floating, level and into the modulation voltage V_M.

4,888,524

CIRCUIT FOR OPERATING GAS DISCHARGE LAMPS WITH A PERIODICALLY ALTERNATING LAMP CURRENT

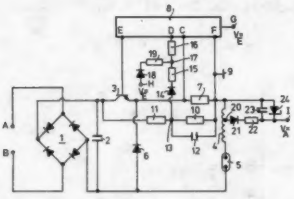
Hans-Günther Ganser, Brockenberg 7a, 5190 Stolberg; Ralf Schäfer, Büchel 34, 5100 Aachen, and Hans-Peter Stormberg, Weissdornweg 52, 5190 Stolberg, all of Fed. Rep. of Germany

Continuation of Ser. No. 860,272, May 6, 1986, abandoned. This application Feb. 16, 1988, Ser. No. 158,082

Claims priority, application Fed. Rep. of Germany, May 13, 1985, 3517248

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—200 R **23 Claims**



1. A circuit arrangement for operating at least one discharge lamp with a periodically varying lamp current and adapted for connection to an alternating voltage source having a period duration N, the circuit arrangement comprising: a controlled semiconductor switch coupled to said alternating voltage source and said discharge lamp so as to control the flow of a periodically varying current to the lamp, a control circuit for switching the controlled semiconductor switch with a switching period duration S which depends upon a comparison between an actual signal proportional to the lamp current and a nominal signal, and means for deriving, during operation of the lamp, the nominal signal from a voltage produced across the controlled semiconductor switch.

4,888,525

SUN TANNING APPARATUS HAVING ELECTRONIC OPERATING SYSTEM

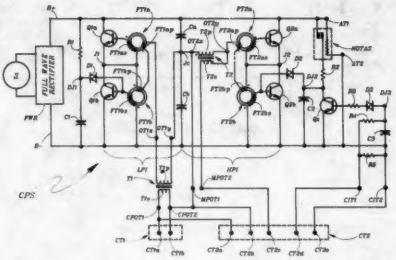
Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010

Filed May 17, 1985, Ser. No. 735,162

Int. Cl.[4] H05B *41/36*

U.S. Cl. 315—212 **23 Claims**

1. In a sun tanning apparatus adapted to be powered from an ordinary electric utility power line, the improvement comprising:
central power supply connectable with said power line and operable to provide a first central output of a first AC voltage and a second central output of a second AC voltage, said power supply having central control input terminals and being operative to reduce the magnitude of said second AC voltage after having received at said central control input terminals a control signal for longer than a certain period of time;
a plurality of lamp-ballast assemblies, each such assembly having: (i) a fluorescent tanning lamp means having thermionic cathodes, each cathode having a pair of cathode input terminals, said lamp means having a pair of lamp input terminals and requiring thereacross a voltage of a first magnitude for proper starting and a voltage of a second magnitude for proper operation of said lamp means, said second magnitude being substantially lower than said first magnitude, (ii) first input terminal means connected in circuit with said pairs of cathode input terminals by way of isolating transformer means, (iii) second input terminal means connected with an L-C series-circuit having an inductor means and a capacitor means and



being series-resonant at or near the frequency of said second AC voltage, said lamp input terminals being effectively connected in parallel with said capacitor means,(iv) voltage-clamping means effectively connected in parallel with said capacitor means and operative to cause clamping of the voltage developing thereacross so as to prevent its magnitude from substantially exceeding said first magnitude, and (v) sensing means connected with the voltage-clamping means and operative to provide said control signal at a pair of control output terminals whenever said voltage-clamping means acts to cause said clamping; and
distribution conductor means operative, for each lamp-ballast assembly, to connect: (i) said first central output with said first input terminal means, (ii) said second central output with said second input terminal means, and (iii) said central control input terminals with said control output terminals;
whereby the central power supply is operative to: (i) provide cathode heating power to said cathodes, (ii) provide lamp operating power to said lamp means, and (iii) reduce the magnitude of said second AC voltage if in any one of the plurality of lamp-ballast assemblies said clamping occurs for longer than said certain period of time.

4,888,526

OPERATING SYSTEM FOR SUN TANNING APPARATUS

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

Filed May 6, 1985, Ser. No. 731,005

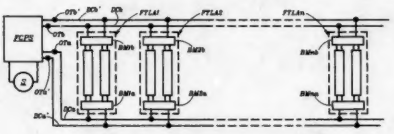
Int. Cl.[4] H05B *41/00*

U.S. Cl. 315—324 **16 Claims**

12. An operating system for a sun tanning apparatus, comprising:
power conditioning means operable to connect with an ordinary electric utility power line and, when so con-

nected, to provide substantially non-current-limited AC voltage at a set of central output terminals;

a plurality of fluorescent lamp assemblies, each lamp assembly having: i) an elongated shape, ii) a first set of input connect means located at one end of said elongated shape, iii) a second set of input connect means located at the other end of said elongated shape, iv) a major axis defined as a line drawn between the two sets of input connect means, v) a fluorescent lamp having a first and a second thermionic cathode, vi) cathode heating means connected in circuit between said input connect means and said cathodes, and conditionally operable to provide low-voltage heating power thereto, and vii) current-limiting means connected in circuit between said connect means and said cathodes, and conditionally operable to provide current-



limited AC voltage for starting and operating the fluorescent lamp; said lamp assemblies being so disposed as to have: i) their major axes aligned substantially in parallel with one another, ii) their first connect means disposed along a first path, and iii) their second connect means disposed along a second path; and

distribution means having a first and a second pair of distribution conductors connected with said central output terminals, said first pair of distribution conductors being connected with the first connect means of each lamp assembly, said second pair of distribution conductors being connected with the second connect means of each lamp assembly;

whereby said AC voltage is distributed to each lamp assembly, thereby causing said low-voltage heating power and said current-limited AC voltage to be provided.

4,888,527

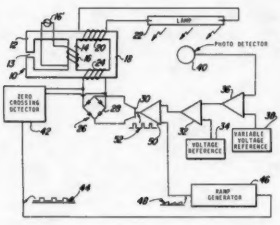
REACTANCE TRANSFORMER CONTROL FOR DISCHARGE DEVICES

Peter J. Lindberg, 36407 Dowling, Livonia, Mich. 48150

Filed Nov. 13, 1987, Ser. No. 120,466

Int. Cl.[4] H05B *41/16*

U.S. Cl. 315—282 **6 Claims**



5. A current limiting power supply for controlling the light output of a gas discharge lamp comprising:

a high leakage reactance transformer having a core with three legs defining two magnetic loops with a common leg,

one of the loops having a constant magnetic reluctance and having a gap in the core to establish the magnetic reluctance,

an output winding on the other loop for supplying an output to a gas discharge lamp,

a control winding on the said other loop for regulating the loop reluctance to control the output current, the control winding being effective to selectively change the output to turn the lamp full on and full off, and

a control circuit couples to the control winding comprising a variable impedance switchable between high and low values to selectively load the control winging sufficiently to extinguish the lamp and alternatively unload the control winding to turn the lamp full on,

whereby the output current and light output are controlled by suitably switching the impedance to vary the duty cycle of the lamp.

4,888,528

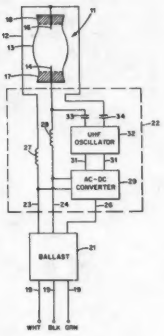
METHOD OF AND APPARATUS FOR ULTRAHIGH FREQUENCY STARTING OF HIGH INTENSITY DISCHARGE LAMPS

Wojciech W. Byszewski, Concord; Scott J. Butler, Rochdale; Robert J. Regan, Needham, and Joseph M. Proud, Wellesley Hills, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation of Ser. No. 67,033, Jun. 29, 1987, abandoned. This application Sep. 6, 1988, Ser. No. 243,118

Int. Cl.[4] H05B *41/00*

U.S. Cl. 315—344 **21 Claims**



17. Apparatus for providing light comprising

a high intensity discharge lamp having an envelope of light transmitting material for enclosing a metal halides vapor, said lamp having a pair of opposed ends, a first electrode extending through one of said ends into said envelope, a second electrode extending through the other of said ends into said envelope whereby said electrodes are separated apart within said envelope, and a circumferential conductive mesh surrounding said envelope, said mesh being coupled to said second electrode but physically separated from said first electrode;

means for applying an alternating voltage at household frequency to said electrodes;

means for applying an ultrahigh frequency field to said lamp, wherein

said household frequency is 60 Hertz,

said lamp has a supporting base therefor, and

said means for applying an ultrahigh frequency field is housed within said base;

a ballast, said ballast being adapted to house said means for applying an alternating voltage at household frequency;

a first conductive means for conveying ac power to said ballast;

a second conductive means for conveying a neutral line to said ballast;

a third conductive means for conveying a ground connection to said ballast;

a fourth conductive means and a fifth conductive means for providing balanced alternating voltage thereacross, outputted from said ballast;

a sixth conductive means for conveying a ground connection from said ballast;

a first inductive means coupled across said fourth conductive means and one of said electrodes;

a second inductive means coupled across said fifth conductive means and the other of said electrodes;

ultrahigh frequency oscillating means adapted to be excited by the presence of said balanced alternating voltage across said fourth conductive means and said fifth conductive means, said oscillating means having a pair of output terminals;

a first capacitive means coupling one of said terminals to said one of said electrodes, and

a second capacitive means coupling the other of said terminals to said other of said electrodes.

4,888,529

TELEVISION RECEIVER HAVING MEANS FOR THE SUPPRESSION OF LINE FLICKER

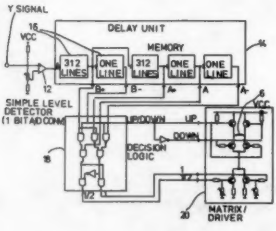
Knud E. Madsen, and Runo R. Nielsen, both of Struer, Denmark, assignors to Bang & Olufsen A/S, Struer, Denmark

Filed Aug. 26, 1988, Ser. No. 236,722

Claims priority, application Denmark, Aug. 26, 1987, 4444

Int. Cl.[4] H01J *29/56*

U.S. Cl. 315—370 **11 Claims**



1. A television receiver comprising means for suppression of line flicker including a detector means for detecting a potential line flicker producing operation of the television receiver, and a control means responsive to a detection signal from said detector means for producing a correction signal to a vertical deflector system of a picture reproducing means of the television receiver whereby a line track of a picture spot is displaced upwardly or downwardly to a location near or nearer a line level of a corresponding neighboring line in a preceding half picture, said detector means being adapted to provide continuous detection of a difference between an intensity of an actual video and an intensity of the actual video signal reproduced in a corresponding picture spot in at least one overlying line or under lying line in an interlace pattern on a screen of the television receiver, and wherein said control means is adapted to produce said correction signal only upon a detection by said detector means that the picture spot is moved along a line portion forming a horizontal line separation between an overlying picture area and an underlying picture area of a pronounced differing light intensity.

4,888,530

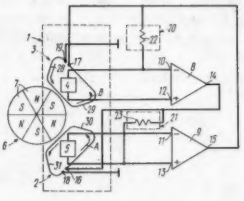
TWO-PHASE GATE MOTOR

Tynu A. Radik, ulitsa Karu, 13, kv.18; Anatol J. Sjugis, ulitsa Toome, 65; Toom A. Pungas, bulvar Sypruse, 219, kv. 3, and Vilie K. Korsen, ulitsa Ranniku, 48b , kv. 10, all of Tallin, U.S.S.R.

Filed Nov. 23, 1988, Ser. No. 294,067

Int. Cl.[4] H02K *29/08*

U.S. Cl. 318—254 **4 Claims**



1. A two-phase gate motor comprising a stator (1) equipped with power windings (2,3) having different phases, magneto-sensitive rotor position pickups (4,5) displaced in the immediate vicinity of these power windings (2, 3), a rotor (6) made as a permanent magnet having poles (7) on the active surface facing the power windings (2, 3) and the magneto-sensitive rotor position pickups (4, 5), and first and second operational amplifiers (8, 9) having inverting and non-inverting inputs (10, 11 and 12, 13) connected to outputs of the magneto-sensitive rotor position pickups (4,5) and also having outputs (14, 15) connected to first leads (16, 17) of the power windings (2, 3) whose second leads (18, 19) are electrically connected to a common bus, characterized in that each first operational amplifier (8) and second operational amplifier (9) is provided with a means (20, 21) for compensation of electromagnetic interferences produced by the power winding (3, 2) of the adjoining phase in the magneto-sensitive rotor position pickup (4, 5), said means (20, 21) being electrically connected to one of the inputs (10, 13) of the first and second operational amplifier (8, 9) and to an output (15, 14) of the second and first operational amplifier (9,8).

4,888,531

VARIABLE DRIVE MECHANISM FOR THE PANEL OF A GATE OR SIMILAR STRUCTURE

Michael Hörmann, Westfalen, Fed. Rep. of Germany, assignor to Hörmann KG Antriebs- und Steuerungstechnik, Harsewinkel, Fed. Rep. of Germany

Filed Feb. 2, 1988, Ser. No. 151,498

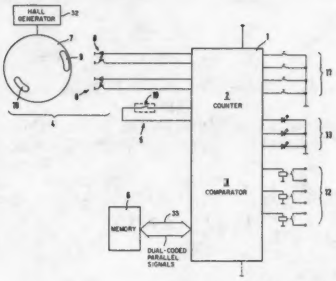
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1987, 3704417; Jan. 18, 1988, 8800517[U]

Int. Cl.[4] G05D *3/00*

U.S. Cl. 318—282 **21 Claims**

1. An arrangement for controlling a drive mechanism with a driving motor for moving a gate back and forth between two limiting positions and selectively through at least one stop position along a predetermined path, comprising: switching means for determining when a predetermined limiting position or stop position is being approached and emitting signals to switch off operating power to said motor; at least one reference-point detector for generating a synchronization signal when said gate travels through a predetermined reference-point position between said limiting positions; memory means for accepting, storing, and emitting data of said limiting positions and data of said selectively at least one stop position; and a position detector for supplying a value representing every actual position traveled through by said gate, said position detector receiving a positional-value readjustment dependent on said synchronization signal, said position detector releasing an output signal for switching off the operating power to said

motor dependent on the direction the reference-point position is traveled through according to the predetermined limiting position or the stop position of said gate along said direction



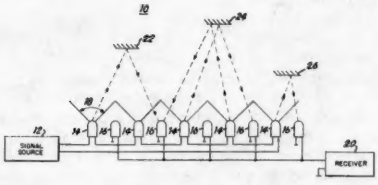
and selectively determined by a related output from said memory means once said gate arrives at said reference-point position.

4,888,532

OBJECT SENSING APPARATUS

Bert O. Jösson, Vintrie, Sweden, assignor to Besam AB, Landskrona, Sweden

Filed May 30, 1980, Ser. No. 155,008
Claims priority, application Sweden, May 31, 1979, 7904749
Int. Cl.[4] H02P *1/04*
U.S. Cl. 318—480 **8 Claims**



1. Obstacle detection apparatus, comprising:

a transmitting array comprising a plurality of radiation emitting elements spaced along a first straight line, said elements being arranged within radiation beamwidth controlling means comprising a first opaque U-shaped cross-section channel for providing a selected diverging first radiation beamwidth in an angular coordinate transverse to said line, each of said emitting elements having a wide second radiation beamwidth in a plane including said line, each of said emitting elements having substantially the same beam direction, whereby the beams of said elements overlap in said plane to form diffuse illumination;

a receiving array comprising a plurality of radiation detecting elements spaced along a second straight line, parallel to and spaced from said first straight line, said elements being arranged within beamwidth controlling means comprises a second opaque U-shaped cross section channel, parallel to said first channel for providing a selected diverging first receiving beamwidth in an angular coordinate transverse to said line said detecting elements having a wide second receiving beamwidth in a plane including said line, each of said detecting elements having substantially the same direction of sensitivity whereby the beams of said elements overlap and said elements collectively respond to diffuse radiation;

means for simultaneously providing said emitters with electrical signals to be radiated;

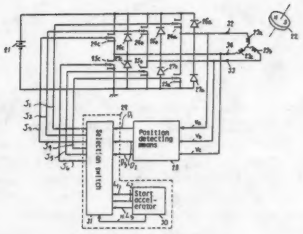
and means for receiving signals detected by said detecting elements thereby to determine the presence of a radiation reflecting object within a region of space corresponding to said first transmitting and first receiving beamwidths and the length of said arrays.

4,888,533

BRUSHLESS DC MOTOR

Makoto Gotoh, 1-18, 2-chome, Naruo-Cho, Nishinomiya-shi, Hyogo-ken 663, and Kouji Hamaoka, 4-459,, Onji kitamachi, Yao-shi, Osaka-fu 581, both of Japan

PCT No. PCT/JP86/00207, § 371 Date Feb. 22, 1988, § 102(e) Date Feb. 22, 1988, PCT Pub. No. WO87/06780, PCT Pub. Date Nov. 5, 1987
PCT Filed Apr. 25, 1986, Ser. No. 144,923
Int. Cl.[4] H02P *1/00*
U.S. Cl. 318—524 **9 Claims**



1. A brushless DC motor comprising:

a rotor having N pairs (N being an integer number) of magnetic poles having a magnetic field, the poles being provided by permanent magnets;

a plurality of three-phase coils interacting with a magnetic flux of the magnetic field of said rotor;

a plurality of first driving transistors having input and output terminals, the first driving transistors forming a current path from a direct current power source to said three-phase coils;

a plurality of second driving transistors having input and output terminals, the second driving transistors forming a current return path from said three-phase coils to said direct current power source;

a plurality of first diodes in parallel between the input terminals and the output terminals of said first driving transistors;

a plurality of second diodes in parallel between the input terminals and the output terminals of said second driving transistors;

a position detecting means for generating a control signal by detecting a terminal voltage on the input and output terminals to said three-phase coils;

a switching-driving part for outputting a switching signal to said first driving transistors and to said second driving transistors on the basis of the control signal from said position detecting means, to switch the current flow to said coils in turn; and

said position detecting means comprising:

a filter means for producing smoothed filtered signals from said respective three-phase coil terminal voltages;

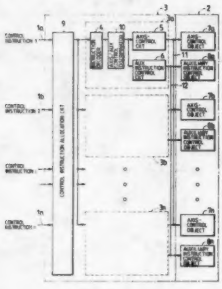
mixing means for combining the filtered signals to produce mixed signals from said smoothed filtered signals; and

comparing means for producing a digital signal by comparing said mixed signals, an output signal of this comparing means being a control signal of said position detecting means.

4,888,534
NUMERICAL CONTROL APPARATUS

Kiyoshi Kuchiki, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 305,054
Claims priority, application Japan, Feb. 2, 1988, 63-22220
Int. Cl.[4] G05B *19/10*
U.S. Cl. 318—567 5 Claims

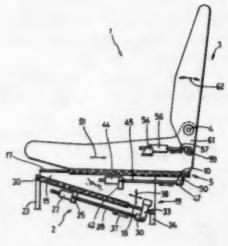


1. A numerical control apparatus for controlling at least one pair of a first object (7) having an axis to be controlled by an axis control instruction and a second object (8) having a variable member other than an axis to be controlled by an auxiliary control instruction, comprising: a control instruction allocation circuit (9) for deciding an existence of said pair of objects and allocating said axis control instruction and said auxiliary control instruction thereto, and a control portion (3*a*) responsive to said axis control instruction and said auxiliary control instruction for controlling said pair of objects.

4,888,535
VEHICLE POWER SEAT CONTROL SYSTEM

Enzo Brusasco, Turin, Italy, assignor to R.G.B. S.p.A., Italy

Filed Jul. 22, 1988, Ser. No. 223,549
Claims priority, application Italy, Aug. 7, 1987, 67698 A/87
Int. Cl.[4] G05B *19/42*
U.S. Cl. 318—568.1 12 Claims



1. A control system for a vehicle power seat (1), said system comprising at least an electric actuator (27, 44, 56) for powering one seat movement, and control means (80, 80', 80'') for controlling operation of the same; an electronic control system (70) for detecting operation of said control means (80, 80', 80'') and for electrically connecting a power supply to said actuator (27, 44, 56) over supply wires (77, 77') which, when said actuator (27, 44, 56) is idle, cuts off from the said power supply;

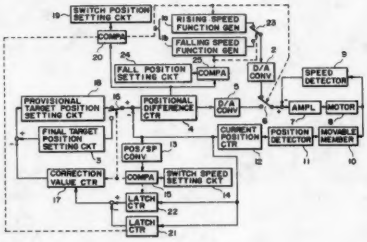
said electronic control system (70) includes a first means (94) for detecting operation of said control means (80, 80', 80'') via a variation in an electric input signa; said first means (94) determining, via a second means (103, 112), a status of the means (83) for electrically connecting the power supply to said actuator (27, 44, 56) over said supply wires (77, 77'); and

said second means including a relay (112) for establishing the status of the means for electrically connecting said power supply to said actuator (27, 44, 56) over said supply wires (77, 77').

4,888,536
DEVICE FOR CONTROLLING POSITIONING OF AN OBJECT

Toshikazu Sakai, Kawasaki, and Makoto Higomura, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1987, Ser. No. 28,406
Claims priority, application Japan, Mar. 24, 1986, 61-63939
Int. Cl.[4] G05B *11/18*
U.S. Cl. 318—592 8 Claims



5. A device for controlling the position of a movable member, comprising:

driving means for moving the movable member;

speed controlling means for controlling said driving means in accordance with a speed instruction related to the moving speed of the movable member; and

position controlling means for controlling, after said driving means is controlled by said speed controlling means, said driving means for a first period so that the movable member is positioned at a provisional target position and for a second period, after the moving speed of the movable member becomes, for a first time, equal to zero, so that the movable member is positioned at a final target position,

wherein the provisional target position is selected so that for the first time, after said driving means is controlled by said speed controlling means, the moving speed of the movable member becomes equal to zero as the movable member comes very close to the final target position.

8. A method of controlling the position of a movable member, comprising the steps of:

controlling a driving means for moving the movable member in accordance with speed instruction data related to a moving speed of the movable member;

after the driving means is controlled in accordance with the speed instruction data, controlling the driving means on the basis of any difference between provisional target position data and current position data related to a current position of the movable member;

after the driving means is controlled in accordance with the speed instruction data and after current moving speed data related to the current moving speed of the member becomes, for a first time, equal to a set moving speed, controlling he driving means on the basis of any difference between final target position data and the current position data; and

storing, for correction of the provisional target position data, the current position data at a time, after the driving means is controlled in accordance with the speed instruction

data, when the current moving speed data becomes, for the first time, equal to the set moving speed.

4,888,537

METHOD OF MONITORING THE END POSITION OF A CONTROLLING ELEMENT AND CIRCUIT ARRANGEMENT FOR THE CARRYING OUT OF THE METHOD

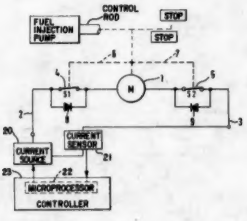
Hans-Günter Appel, Bad Soden; Heinz-Friedrich Ohm, Weiterstadt; Klaus Bluhm, Steinbach/Ts., and Kurt Probst, Schwalbach, all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 25, 1988, Ser. No. 185,500

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719494

Int. Cl.[4] G05G *5/00*

U.S. Cl. 318—626 4 Claims



1. A method of monitoring end positions of a controlling element driven by a servomotor to actuate a device, particularly a displacement device for controlling engine output power of an internal combustion engine, wherein controlling of the servomotor is effected by an electronic control unit having a processor with a sensor of current, the controlling element being acted on by said control unit via said servomotor with a sequence of control pulses, the method comprising steps of:

operating the servomotor by a current in a first direction to drive the controlling element, said operating including the supplying of current by a switch serially connected in an electric power line of the servomotor;

sensing a flow of current through the switch to determine switch state, said switch being mechanically coupled to said device;

interrupting the operation of the servomotor after recognition of one of the end positions, said interrupting being accomplished by opening said switch; and

applying current to the servomotor in opposite direction with a well-defined control pulse, said applying being accomplished connecting a diode across said switch with forward current characteristic opposite the direction of original current flow.

4,888,538

SYSTEM FOR REMOTE TRANSMISSION OF ANGULAR POSITION AND FORCE BETWEEN MASTER AND SLAVE SHAFTS

Dimith T. Dimitrov, Stara Zagora, Bulgaria; Ljudimila I. Matjukhina, Minsk, U.S.S.R.; Alexandr S. Mikhalev, Minsk, U.S.S.R., and Igor M. Chushenkov, Minsk, U.S.S.R., assignors to Belorussky Gosudarstvenny Universitet imeni V.I. Lenina, Minsk, U.S.S.R.

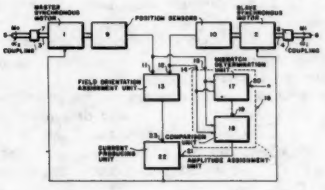
PCT No. PCT/SU87/00058, § 371 Date Jan. 13, 1988, § 102(e) Date Jan. 13, 1988, PCT Pub. No. WO87/07419, PCT Pub. Date Dec. 3, 1987

PCT Filed May 14, 1987, Ser. No. 174,997

Claims priority, application U.S.S.R., May 19, 1986, 4087425

Int. Cl.[4] G05B *19/42;* H02K *29/06*

U.S. Cl. 318—675 15 Claims



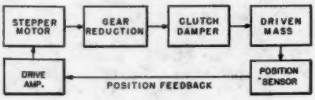
1. A system for remote transmission of the angular position and force between master and slave shafts, comprising master and slave synchronous machines (1,2) whose shafts (3,4) are connected, respectively, to master and slave shafts (5,6) and provided with position sensors (9,10) electrically connected to inputs (11,12) of a field orientation assignment unit (13) for assigning orientation of stator magnetic fields of the master and slave synchronous machines and to information inputs (15,14) of a device (16) for assigning the amplitude of stator magnetic fields of the master and slave synchronous machines, having the output thereof electrically connected to a control input (21) of a current producing unit (22) producing current in the windings of the master and slave synchronous machines, whose setting input (23) is connected to the output of the field orientation assignment unit (13) for assigning orientation of stator magnetic fields of the master and slave synchronous machines and whose outputs are connected to electrically linked respective windings of the master and slave synchronous machines (1,2), characterized in that device (16) for assigning the amplitude of stator magnetic fields of the master and slave synchronous machines comprises a mismatch determination unit (17) for determination of the assigned mismatch between the shafts of the master and slave synchronous machines, having a setting input (20) which receives a signal corresponding to a scale factor (n) of the force transmitted to the shaft (3) of the master synchronous machine (1) and information inputs which are the information inputs (14,15) of the device (16) for assigning the amplitude of stator magnetic fields of the master and slave synchronous machines, and a comparison unit (18) whose information inputs are connected to information inputs of the mismatch determination unit (17) for determination of the assigned mismatch of the shafts of the master and slave synchronous machines, while a setting input (19) thereof is connected to the output of the mismatch determination unit (17) for determination of the assigned mismatch of the shafts of the master and slave synchronous machines, and the output of which is the output of the device (16) for assigning the amplitude of stator magnetic fields of the master and slave synchronous machines.

4,888,539

CLUTCH/DAMPER

Robert M. Estabrook; Terrence J. Furtmann, both of Glendale, and Svenn A. Norstrom, Phoenix, all of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 4, 1987, Ser. No. 45,635
Int. Cl.[4] G05B *19/40*
U.S. Cl. 318—685 **4 Claims**



1. Apparatus for control of angular reaction torques applied by a motor-driven mass to a drive motor, comprising: input means coupled to said motor and adapted for rotary motion about a first axis,

drive means having first and second substantially coplanar radially disposed friction faces and adapted for rotary motion about a second axis,

output means adapted for rotary motion about said second axis and coupled to energize said driven mass, wherein said output means comprises an axial shaft having a plate affixed laterally thereto, said plate having a substantially planar radially disposed face, rotatably engaging said first face of said drive means,

energy absorbing means for coupling said drive means to said output means, said energy absorbing means allowing free transfer to said output means of rotary energy applied to said drive means by said input means so long as a predetermined slip torque is not exceeded, and for absorbing transfer of energy stored in said driven mass to said input means when said predetermined slip torque is exceeded, and

positional feedback means including a sensor coupled to said driven mass for providing a control signal representative of an angular position of said driven mass to said drive motor and motive power means responsive to said control signal for incrementally positioning said drive motor so as to restore the relative angular positions of said output means with respect to said input means when said driven mass is angularly displaced by said reactive torque,

said energy absorbing means cooperating in series relationship with said feedback means and with said drive means and said output means to provide clutch means for damping excursions of said drive motor and coupling of reactive torques between said drive motor and said driven mass in excess of a predetermined value.

4,888,540

ELECTRONIC TORQUER INTERFACE AND ERECTION CONTROL CIRCUIT

Larry J. Terpstra, Central Lake, and William R. Babel, Charlevoix, both of Mich., assignors to Allied-Signal Inc., Morris County, Morris Township, N.J.

Filed Aug. 10, 1987, Ser. No. 60,283
Int. Cl.[4] G05B *17/00*
U.S. Cl. 318—689 **12 Claims**

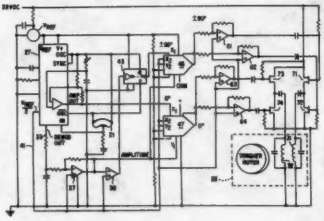
1. Level control arrangement which includes a torquer motor and a tilt transducer, characterized by:

(a) means to provide the tilt transducer with a first signal and a second signal, the second signal being an oscillator signal;

(b) the tilt transducer providing a level output signal, in which the relative influence of the first and second signals is dependent upon a level condition sensed by the tilt transducer;

(c) means responsive to the oscillator signal and the level output signal, to demodulate the output of the tilt transducer, and said means responsive to the oscillator signal including a comparator for comparing signal levels of the level output signal and at least one of the first and second signals; and

(d) means responsive to the demodulated output of the tilt transducer to control the torquer motor in response to the



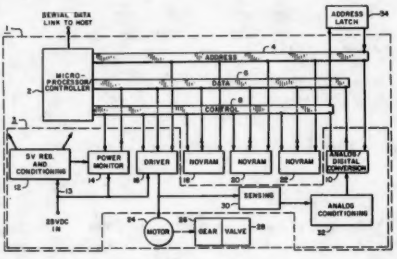
demodulated output and the oscillator signal, and said means responsive to the demodulated output being responsive to a voltage level and further providing an output to the torquer motor in which the output has a directional component which is dependent upon the magnitude of the voltage level.

4,888,541

METHOD AND APPARATUS FOR CONTROLLING STEPMOTOR MECHANICAL DRIVES

Jack Russell, 1019 Harms Ave., Libertyville, Ill. 60048

Filed Oct. 23, 1987, Ser. No. 113,176
Int. Cl.[4] H02P *8/00*
U.S. Cl. 318—696 **12 Claims**



1. A method for determining loading of a rotary stepmotor having stator windings and a rotor driving an output shaft in incremental motion comprising the steps of:

applying predetermined number of time based voltage pulses to said stepmotor windings from a voltage source;

defining a predetermined number of incremental motions of said stepmotor rotor corresponding to said voltage pulses, as a completed step; sampling stepmotor winding current transients resulting from application of said voltage pulses to said stepmotor windings for each said motion in said step;

determining current excursions of said current transients for each motion in said step and normal stepmotor shaft loads;

determining critical relationships in said excursions for identifying rotor incremental motion;

establishing weighted values of said winding current transients during stepmotor operation;

computing said critical relationships using said weighted values;

comparing said weighted stepmotor operational transient

values utilizing said critical relationships for identifying completed stepmotor shaft steps.

4,888,542

DRIVING METHOD OF A STEPPING MOTOR

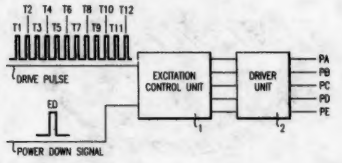
Akinori Muranaka, Fujieda, Japan, assignor to Star Seimitsu Kabushiki Kaisha, Shizuoka, Japan

Filed Jul. 12, 1988, Ser. No. 217,986

Claims priority, application Japan, Jul. 14, 1987, 62-175650

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **5 Claims**



1. In a driving system of a stepping motor, wherein an excitation winding is arranged for each of a plurality of phases and current is supplied to each of said windings by an excitation system including at least three phases in an excited state according to an excitation sequence when a drive pulse is input so as to produce a torque which yields a phase vector from the winding to which the current is supplied, thereby producing an excitation vector by adding said vectors, and said motor is driven by controlling the current supplied to said each winding means of said excitation system together with the input of said drive pulse so as to rotate said excitation vector, a method for driving a stepping motor comprising the steps of:

at a final excitation period of said motor, breaking or reducing the current supplied to the windings which produce phase vectors other than the winding which produces a phase vector having the same direction as that of said excitation vector or, when the vector resulting from the addition of phase vectors from windings which produce phase vectors having directions different from that of said excitation vector, has the same direction as that of said excitation vector, breaking or reducing the current supplied to the winding which produces the phase vector.

4,888,543

DRIVE ARRANGEMENT, AND MOTOR-ENERGIZING SYSTEM FOR USE IN THE ARRANGEMENT

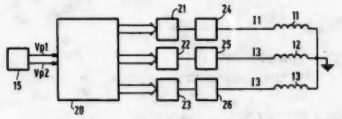
Robert Bleijenberg, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 17, 1988, Ser. No. 208,951

Claims priority, application Netherlands, Jun. 19, 1987, 8701438

Int. Cl.[4] H02P *5/40*

U.S. Cl. 318—721 **13 Claims**



1. In a drive arrangement having a multi-phase synchronous motor comprising a stator and a movable element having a plurality of phase windings in electromagnetic coaction with said stator, means for outputting a position value of the movable element relative to the stator and for incrementing or decrementing the position value depending on the direction of movement of said movable element, and energizing means for generating in said phone windings energizing currents whose values are periodic functions of the position of said movable element, each of the periods of the functions corresponding to a displacement of said movable element of 360 electrical degrees and the phase difference between the energizing currents defined by the periodic functions being constant, wherein the improvement comprises:

adjustment means for adjusting the position value prior to activation of said energizing means to an initial position value for which the energizing currents defined by said initial position value produce a maximal force on said movable element upon activation of said motor energizing system, said adjustment means comprising

signal generating means for generating measurement alternating currents in consecutive different phase windings in successive time intervals for inducing a vibration of said movable element having an amplitude small relative to the period of said periodic functions, the measurement alternating currents generated in each phase winding having amplitudes equal to a gain factor times the function value for the respective phase winding of a plurality of different auxiliary position values for producing said vibration of said movable element,

means for determining the optimum auxiliary position value for which the ratio between the amplitude of the vibration and the gain factor is maximal for a predetermined relationship between the signs of the measurement alternating currents and the directions of the forces on said movable element generated by the measurement alternating currents, and

means for adjusting said initial position value to said optimum auxiliary position value.

4,888,544

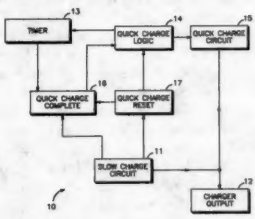
BATTERY CHARGER

Brian K. Terry, Coral Spring; Steven D. Hall, Plantation, both of Fla., and Robert J. McDermott, Dubuque, Iowa, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 4, 1988, Ser. No. 140,510

Int. Cl.[4] H02J *7/04*

U.S. Cl. 320—37 **2 Claims**



1. A battery charger comprising:

a first charging means constituting a current source for providing a substantially constant trickle battery charging current,

a second charging means constituting at least one current source for providing an additional battery charging current,

a charging control means including manually actuable means for selectively actuating the second charging means for providing said additional battery charging current, whereby the first and second charging means cooperatively provide a quick charging current,

a timer means actuatable by said charging control means for timing the operation of the second battery charging means,

a charge complete means responsive to said timer means for

actuating the charging control means to discontinue operation of said second charging means, and for inhibiting said charging control means from resetting said timer means when said second charging means is operating, and

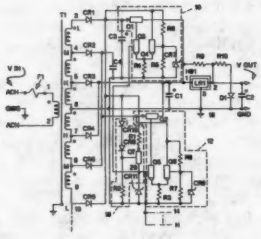
a reset means connected to the charging control means and responsive to discontinuation of charging by said first charging means for conditioning the charging control means for permitting actuation of the second charging means.

4,888,545

IMPROVED TAP SWITCHING POWER SUPPLY

Nicholas Celenza, Durham, and Elie M. Najm, Cary, both of N.C., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jun. 1, 1988, Ser. No. 201,003
Int. Cl.[4] H02M *1/10*
U.S. Cl. 323—258 **14 Claims**



1. An improved power supply for providing a constant voltage at a constant current comprising:

a linear regulator circuit arrangement;

a bulk capacitor for providing a voltage that varies within a relatively narrow range connected to said linear regulator;

a power transformer comprising a primary winding for coupling to a variable input supply voltage source and a plurality of secondary windings coupled in series and disposed relative to the primary windings;

a plurality of coil selection circuit arrangements connected to the secondary windings; said plurality of coil selection circuit arrangements directly monitoring coil voltages developed on the plurality of secondary windings and generating therefrom a plurality of different control voltages which are compared simultaneously with a fixed reference voltage and the selection circuit arrangement whose control voltage falls within a selected range of values conducts current from its secondary winding to charge the bulk capacitor until the selected range of values is exceeded whereby the selection circuit arrangement which is presently charging the capacitor is deactivated and another selection circuit arrangement whose control voltage falls within the selected range of values is activated to charge the capacitor.

4,888,546

DEVICE FOR MEASURING SEAM RESISTANCE

Mark D. Berry, Columbia; Henry C. Brisker, Montgomery County, and Andrew A. Cuneo, Jr., Towson, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 10, 1989, Ser. No. 322,391
Int. Cl.[4] G01R *27/14*
U.S. Cl. 324—64 **12 Claims**

1. A portable seam resistance measuring apparatus comprising:

a housing having at least one flat exterior surface;

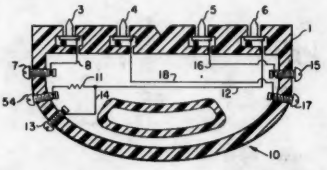
a plurality of apertures located on said flat exterior surface;

a v-shaped indicator located at the midpoint of said flat exterior surface such that placing said v-shaped indicator over a seam between two metallic wall panels centers said flat exterior surface over said seam;

at least two current injection probes located within two of said apertures with at least one of said current injection probes on either side of said v-shaped indicator;

at least two voltage injection probes located within two of said apertures with at least one of said voltage injection probes on either side of said v-shaped indicator;

means for causing said current injection probes and said voltage injection probes to extend a fixed distance above



said flat exterior surface and to retract flush with said flat exterior surface when subjected to an external inward force;

a plurality of connectors attached to the outside of said housing;

means for supplying an electrical current through a pair of said connectors to said current injection probes;

means for measuring said current;

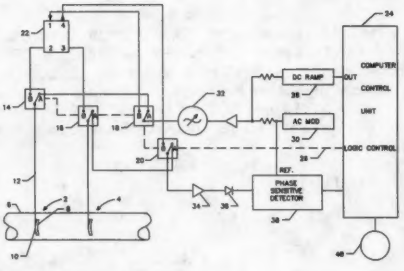
means for measuring the voltage between said voltage injection probes whereby the resistance of a seam between two metallic wall panels can be calculated.

4,888,547

METER USING A MICROWAVE BRIDGE DETECTOR FOR MEASURING FLUID MIXTURES

Vincent P. McGinn, Tulsa, Okla., and Ira B. Goldberg, Thousand Oaks, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 23, 1989, Ser. No. 299,695
Int. Cl.[4] G01N *22/00*
U.S. Cl. 324—58.5 A **10 Claims**



1. A meter comprising:

a waveguide through which a substance to be measured can flow;

a transmitting antenna in the waveguide;

a detecting antenna in the waveguide spaced a predetermined distance from the transmitting antenna along the flow path of the waveguide;

a microwave bridge having a power input port, a transmitting output port connected to the transmitting antenna, a detecting output port connected to the detecting antenna, and a bridge output port which measures the difference in the power to the two antennas;

a microwave generator connected to the input of the microwave bridge;

a phase sensitive detection system connected to the bridge output port for providing an output of a frequency characteristic of microwave propagation within the waveguide; and

a switch connected to each of the ports of the microwave bridge for switching the microwave bridge out of the circuit and connecting the transmitting antenna to the microwave generator and the detecting antenna to the phase sensitive detection system.

4,888,548

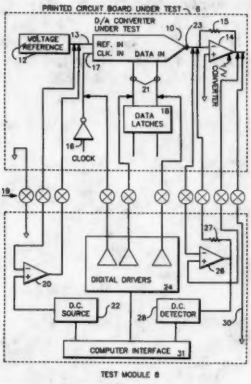
PROGRAMMATICALLY GENERATED IN-CIRCUIT TEST OF DIGITAL TO ANALOG CONVERTERS

Wayne R. Chism, Greeley, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 31, 1988, Ser. No. 175,713

Int. Cl.[4] G01R *19/257, 31/00*

U.S. Cl. 324—73 R **16 Claims**



6. A process for programmatically performing in-circuit pin checks and gross functionality tests of a digital to analog converter which is a component in a circuit, comprising the steps of:

providing a test module having a precision DC source means for providing a desired reference signal;

connecting the test module to the circuit;

isolating the digital to analog converter under test from surrounding circuitry;

applying the reference signal to a reference input of said digital to analog converter and an appropriate bit pattern to digital data inputs of said digital to analog converter;

measuring an output current of said digital to analog converter under test;

comparing said output current to an expected response for said digital to analog converter;

evaluating the digital to analog converter performance using deterministic and non-deterministic bit evaluation techniques for testing high and low order bits.

4,888,549

SYSTEM FOR TESTING INDIVIDUALLY A PLURALITY OF DISK DRIVE UNITS

Randall R. Wilson, Santa Ana, and James E. Dietz, Yorba Linda, both of Calif., assignors to Wilson Laboratories, Inc., Orange, Calif.

Filed Oct. 30, 1987, Ser. No. 115,164

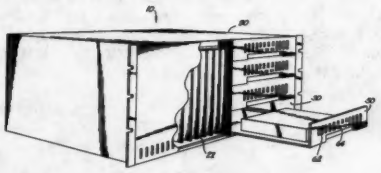
Int. Cl.[4] G01R *15/12;* **G01K** *31/28;* **H05K** *7/14;* **G11B** *27/36*

U.S. Cl. 324—73 R **6 Claims**

1. A system for testing a plurality of storage peripheral devices comprising;

a test module containing a plurality of ports,

a plurality of carrier means for holding one or more storage peripheral devices, the carrier means being further adapted to mate with the ports, each carrier containing a status indicator which indicates the status of the storage



peripheral device even when the carrier is removed from the test module, and

an electrical connection between the test module and each carrier.

4,888,550

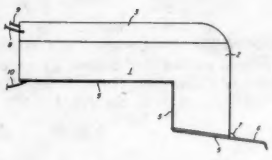
INTELLIGENT MULTIPROBE TIP

Lee R. Reid, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 301,605, Sep. 14, 1981. This application Jul. 19, 1983, Ser. No. 515,441

Int. Cl.[4] G01R *1/06*

U.S. Cl. 324—158 P **6 Claims**



1. A probe assembly for quality control testing of an integrated circuit wafer, characterized by the precision control of said assembly in the z-axis whereby probe tip breakage, excessive over travel, damaged circuit wafers and machine downtime is substantially reduced, said assembly including:

(a) a probe tip mounting support member consisting essentially of a unitary high resistance piezoelectric material electrically responsive to mechanical pressure thereon;

(b) an electrically conductive probe tip secured to said mounting support and extending outwardly therefrom for subjecting said mounting support member to the mechanical pressure caused by the contact of said probe tip member with an integrated circuit wafer so that a piezoelectric voltage is produced across said support member;

(c) electrically conductive means coupled to the probe tip and secured to and extending along said support member;

(d) means coupled to said probe tip through said electrically conductive means for providing to or receiving therefrom a signal; and

(e) voltage detection means coupled to said support member for detecting the mechanically induced piezoelectric voltage so the z-axis control is precisely maintained.

4,888,551

ROTATION DETECTING DEVICE HAVING A TERMINAL HOLDING ARRANGEMENT

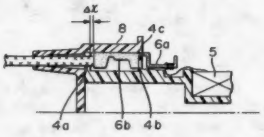
Yasuaki Hata; Takeshi Yasukawa, and Masayoshi Onishi, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 201,856

Claims priority, application Japan, Jun. 4, 1987, 62-87050[U]; Jun. 4, 1987, 62-87051 [U]; Jun. 4, 1987, 62-87049[U]

Int. Cl.[4] G01B *7/30;* **G01P** *3/44;* **H01R** *3/00;* **H01F** *15/10*

U.S. Cl. 324—208 **1 Claim**



1. A rotation detecting device comprising:

a pole formed of a ferromagnetic material;

a bias magnet for applying a magnetic flux to the pole;

a bobbin receiving the pole and the bias magnet in a series arrangement;

a detecting coil mounted on the bobbin;

a pair of terminals each having a coil connecting part connected to a separate end of the wire of the coil and a lead wire connecting part connected to a separate lead wire, said terminals being received within said bobbin;

a cap which fits around said bobbin for covering the terminals and a portion of the bobbin holding the terminals;

a positioning hole formed in each of said terminals; and

positioning projections integrally formed with the bobbin which extend through the positioning holes of the terminals in order to lock the terminals in the position.

4,888,552

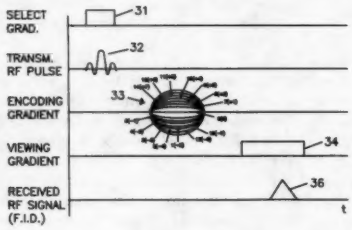
MAGNETIC RESONANCE IMAGING

Avihai Egozi, Netanya, and Saul Stokar, Raanana, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Jan. 5, 1989, Ser. No. 293,767

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **24 Claims**



13. A system for acquiring data for use in reconstructing images of sections of patients in magnetic resonance imaging (MRI) systems, said method comprising:

a large static magnet for receiving a patient therein,

means for scanning a selected section of said patient comprising:

means for applying selecting gradient pulses to select sections of the patient for imaging,

means for applying radio frequency (RF) pulses to generate data signals in the selected sections,

means for applying phase encoding gradient pulses of a different amplitude or polarity, prior to the receipt of each of said data signals to enable obtaining projections of the data signals in the direction of the phase encoding gradient, said phase encoding gradient pulses including initial pulses removed from zero value applied prior to system stabilization and subsequent pulses at and proximate to the zero value applied immediately subsequent to the stabilization,

means for applying viewing gradient pulses during the receipt of said data signals to enable obtaining projections of the signals in the direction of the viewing gradient, and

means for reconstructing the image during the scan substantially before even half of the data has been acquired.

4,888,553

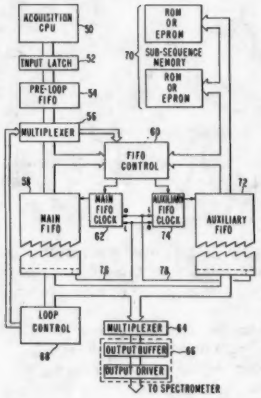
MULTIPLE FIFO NMR ACQUISTION SYSTEM

Robert S. Codrington, Los Altos Hills, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Division of Ser. No. 136,499, Dec. 28, 1987, Pat. No. 4,764,894, which is a continuation of Ser. No. 691,783, Jan. 16, 1985, abandoned. This application Aug. 4, 1988, Ser. No. 228,633

Int. Cl.[4] G06F *15/52;* **G01R** *33/20*

U.S. Cl. 324—312 **1 Claim**



1. Nuclear magnetic resonance apparatus comprising:

magnet means to establish a magnetic field distribution of preselected form over a selected volume region,

excitation means to excite nuclear magnetic resonance in at least a selected portion of said volume region,

signal processing means for detecting and recording nuclear magnetic resonance in said selected portion of said volume region,

first FIFO means for establishing a main sequential list of operational states of said NMR apparatus and second FIFO means for establishing a desired subsequential list of operational states for interposition of said subsequential list within said main sequential list,

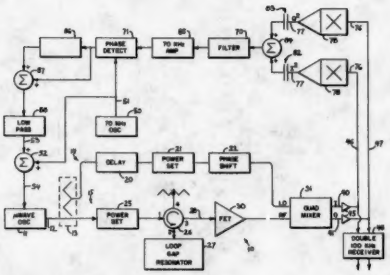
control means for the control and correlation of said excitation means, signal processing means and magnet means in accord with an active operational state derived from either said first FIFO means or said second FIFO means and arbitration means for causing the next operational state of said NMR apparatus to be derived from either said first FIFO means or said second FIFO means in accord with said active operational state.

4,888,554

ELECTRON PARAMAGNETIC RESONANCE (EPR) SPECTROMETER

James S. Hyde, Dousman, Wis., and Jerzy Gajdzinski, Cracow, Poland, assignors to MCW Research Foundation, Inc., Milwaukee, Wis.

Filed Aug. 2, 1988, Ser. No. 227,288
Int. Cl.[4] G01R 33/20
U.S. Cl. 324—316 12 Claims



1. In an electron paramagnetic resonance (EPR) spectrometer which includes a reference arm microwave bridge comprised of a reference arm having a reference arm output, a signal arm having a signal arm output, the signal arm including a microwave circulator connected to a resonant cavity, and mixing means having a predetermined noise figure, the mixing means being connected to the outputs of the reference and signal arms for simultaneously producing first and second EPR output signals which are in phase quadrature with respect to each other, the improvement wherein;

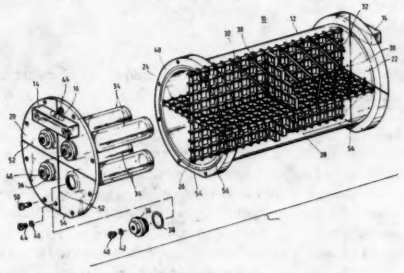
the signal arm includes a microwave amplifier connected between the circulator and the signal arm output, the microwave amplifier having a noise figure which is less than the noise figure of the mixing means.

4,888,555

PHYSIOLOGICAL PHANTOM STANDARD FOR NMR IMAGING AND SPECTROSCOPY

John T. Vaughan, and Bret Lesan, both of Dallas, Tex., assignors to The Board of Regents, The University of Texas, Austin, Tex.

Filed Nov. 28, 1988, Ser. No. 277,008
Int. Cl.[4] G01R 33/20
U.S. Cl. 324—318 14 Claims



14. A Nuclear Magnetic Resonance imaging phantom comprising:

a. a coordinate system grid;

b. a slice-parameter ramp grid adjacent to the coordinate grid; and

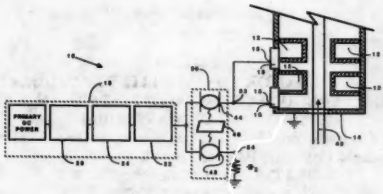
c. a resolution scale in each of three orthogonal planes.

4,888,556

LINEAR INDUCTION ACCELERATOR AND PULSE FORMING NETWORKS THEREFOR

Malcolm T. Buttram, Sandia Park, and Jerry W. Ginn, Albuquerque, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 21, 1988, Ser. No. 209,398
Int. Cl.[4] H05H 9/00
U.S. Cl. 328—233 10 Claims



1. A linear induction accelerator of an electron beam comprising:

a pulse current source consisting of

a constant current source;

switch means for alternately switching the output of said current source between either first or second terminals and ground; and

at least one bipolar converting means, connected between said first terminal and ground, for converting the pulsed current at said first terminal into a bipolar high-voltage, square wave pulse train having a pulse of a first polarity when said output is connected to said second terminal, and a pulse of a second, opposite, polarity when said output is connected to said first terminal;

a matching impedance connected to said second terminal, the impedance at each of said first and second terminals being equal; and

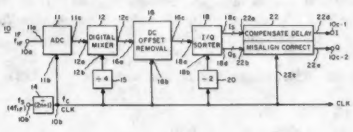
cavity means, connected between said first terminal and ground, for accelerating the electron beam during the pulse of a first polarity and for resetting said cavity during the pulse of a second polarity.

4,888,557

DIGITAL SUBHARMONIC SAMPLING DOWN-CONVERTER

Charles M. Puckette, IV, Scotia, and Gary J. Saulnier, Rexford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 10, 1989, Ser. No. 335,269
Int. Cl.[4] H03D 3/00
U.S. Cl. 329—341 9 Claims



1. A digital subharmonic down-converter, receiving an analog IF signal for providing substantially simultaneous output streams of in-phase I data and quadrature-phased Q data words, comprises:

ADC means for converting the analog IF signal, having a frequency f_{IF}, to a stream of digital data samples taken at a sampling frequency f_S;

digital mixer means for converting the digital data sample stream to a stream of baseband digital data words;

sorter means for separating interleaved alternating ones of the baseband data words stream into sequential sorted pairs of an in-phase I data word and a quadrature-phase Q data word; and

means for causing the ADC means sampling frequency f_c to be a subharmonic of the IF frequency, with

$$f_c = \frac{4}{2n+1} f_{IF},$$

where n is a selected integer greater than zero.

4,888,558

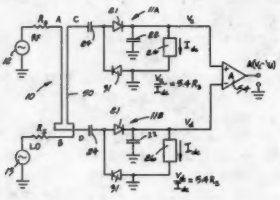
PHASE DETECTOR FOR AMPLITUDE MODULATED RADIO FREQUENCY SIGNALS CONTAINING A LOW FREQUENCY WAVEFORM

Earl C. Hereikson, Otis Orchards, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 26, 1988, Ser. No. 263,107

Int. Cl.[4] H03D *1/00*

U.S. Cl. 329—345 **11 Claims**



1. A low noise floor phase detector for radio frequency signals, comprising:

a transmission line coupler having two signal inputs for respectively receiving incoming signals from two radio frequency sources, and further having two signal outputs which serve as both through ports and coupled ports for the incoming signals;

amplitude detector means connected to the signal outputs of the transmission line coupler for producing two demodulated signals having amplitudes proportional to the amplitudes of any low frequency signals present in the radio frequency signals at the signal outputs of the transmission line coupler; and

summation means operatively connected to the amplitude detectors for producing a signal that is a function of any difference in the amplitudes of the demodulated signals.

4,888,559

CORRECTION ARRANGEMENT FOR AN AMPLIFIER

Joannes M. J. Sevenhans, Brasschaat, and Dirk H. L. C. Rabaey, Wijnegem, both of Belgium, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jun. 29, 1988, Ser. No. 213,004

Claims priority, application Belgium, Jun. 30, 1987, 8700735

Int. Cl.[4] H03F *3/45*

U.S. Cl. 330—253 **11 Claims**

1. An amplifier comprising:

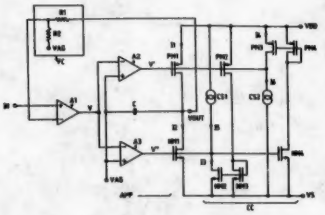
a DC voltage source having first and second poles;

an output stage comprising two output field effect transistors of opposite conductivity type which are each directly coupled in series between a common output junction point and a respective one of said first and second poles, the common output junction point constituting an amplifier output;

two differential amplifiers each having a respective output coupled to a control electrode of a respective one of said output transistors, and

a correction arrangement including at least one correction circuit comprising:

a current mirror circuit including a third field effect transistor having a control electrode directly coupled to the control electrode of one of the output field effect transistors for providing a first measuring current which is proportional to the DC current through said one output transistor;



control means responsive to said first measuring current and to a reference current for changing the DC voltage on the control electrode of the other output field effect transistor as a function of the difference between said first measuring current and said reference current, and

negative feedback means for connecting said amplifier output to respective inputs of the two differential amplifiers.

4,888,560

GAIN-VARIABLE AMPLIFIER CIRCUIT

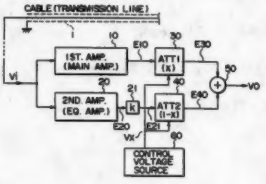
Yoichi Ogura, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 15, 1988, Ser. No. 219,370

Claims priority, application Japan, Jul. 16, 1987, 62-177410

Int. Cl.[4] H03F *3/18*

U.S. Cl. 330—254 **13 Claims**



1. A circuit for compensating for a frequency characteristic of a transmission signal transmitted through a transmission path having a predetermined transmission characteristic, comprising:

first means, having a first predetermined frequency characteristic and a first predetermined amplification factor, for outputting a first signal obtained by changing an amplitude of the transmission signal with a first coefficient in accordance with a predetermined control signal;

second means, having a second predetermined frequency characteristic and a second predetermined amplification factor, for outputting a second signal obtained by changing an amplitude of the transmission signal with a second coefficient, wherein the second predetermined frequency characteristic compensates for a characteristic depending on a length of said transmission path, and a magnitude of the second coefficient is reduced when a magnitude of the

first coefficient is increased and increased when the magnitude of the first coefficient is reduced; and

synthesizing means, coupled to said first and second means, for outputting a synthesized signal of the first signal and the second signal.

4,888,561

AMPLIFIER AND DISPLAY USING THE FORMER

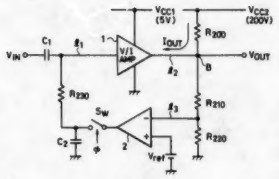
Ryushi Shimokawa; Seiichi Ueda, both of Takasaki; Yasuji Kamata, Hitachi; Kenkichi Yamashita, Katsuta; Kazuo Kato, Ibaraki, and Hideo Sato, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 847,721, Apr. 3, 1986, Pat. No. 4,755,768. This application May 4, 1988, Ser. No. 190,050

Claims priority, application Japan, Apr. 3, 1985, 60-68928; Apr. 3, 1985, 60-68929; Apr. 3, 1985, 60-68930

Int. Cl.[4] H03F *1/30*

U.S. Cl. 330—290 **62 Claims**



1. An amplifier for processing an image signal, said amplifier comprising:

current amplifying means formed on a semiconductor substrate for providing an amplified output current in accordance with an input signal corresponding to said image signal, said current amplifying means being supplied with a first supply voltage having a first predetermined voltage level; and

current-voltage converting means provided outside of said semiconductor substrate for receiving said amplified output current and converting said amplified output current into an output voltage, said current-voltage converting means being supplied with a second supply voltage having a second predetermined voltage level greater than said first predetermined voltage level of said first supply voltage.

4,888,562

LOW NOISE, HIGH SPEED CURRENT OR VOLTAGE AMPLIFIER

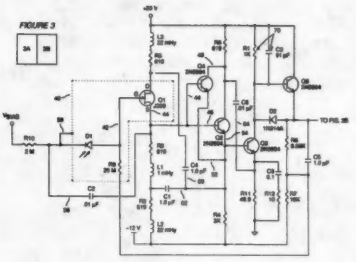
Peter A. Edler, Los Altos, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Sep. 9, 1987, Ser. No. 94,861

Int. Cl.[4] H03F *1/14, 3/08*

U.S. Cl. 330—291 **36 Claims**

1. An amplifier system, which comprises a front end transistor having a control electrode, an input current flow electrode and an output current flow electrode, first coupling means for alternating current coupling the output current flow electrode of said front end transistor to at least one contributor of an effective input capacitance of said amplifier system to reduce the effective input capacitance of said amplifier system, a second stage transistor coupled to said front end transistor having a control electrode, an input current flow electrode and an output current flow electrode, second coupling means for coupling the output current flow electrode of said front end transistor to the control electrode of said second stage transistor, and third coupling means for alternating current coupling the output current flow electrode of said second stage transistor to the input current flow electrode of said front end transistor to reduce the effective input capacitance of said amplifier.



4,888,563

AUDIO AMPLIFIER HAVING A LOW-NOISE INPUT STAGE

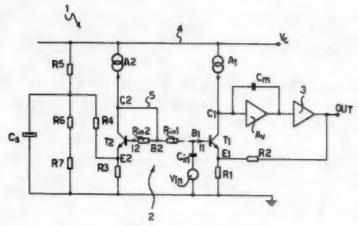
Fabrizio Stefani, Varese, Italy, assignor to SGS-Thomas Microelectronics S.r.L., Agrate Brianza, Italy

Filed Dec. 12, 1988, Ser. No. 283,233

Claims priority, application Italy, Dec. 22, 1987, 23163 A/87

Int. Cl.[4] H03F *3/04*

U.S. Cl. 330—296 **4 Claims**



1. An audio amplifier comprising a low-noise input stage, a gain stage connected to the input stage, and an output stage cascade connected downstream from said gain stage; said input stage comprising first and second transistors having respective base, emitter and collector electrodes, first and second input resistors connected in series between the respective base electrodes of the first and second transistors, means for connecting a signal input for said amplifier to the base electrode of the first transistor, said first transistor being connected in a common emitter configuration with its collector electrode connected to the gain stage and serving as an input to the gain stage, and means for electrically connecting the collector electrode of said second transistor to a node between the series connection of the first and second input resistors whereby said second transistor is in a diode configuration.

4,888,564
PHASE-LOCKED LOOP CIRCUIT

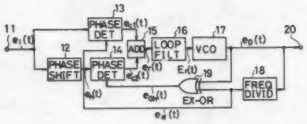
Yukinobu Ishigaki, Machide, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed Nov. 2, 1988, Ser. No. 266,115

Claims priority, application Japan, Nov. 6, 1987, 62-280793; Nov. 18, 1987, 62-291517; Nov. 18, 1987, 62-291518

Int. Cl.[4] H03L *7/08*

U.S. Cl. 331—1 A **6 Claims**



1. A phase-locked loop circuit for multiplying a frequency of an input signal by m to produce a frequency-multiplied signal, where m is an integer equal to or larger than 2, said phase-locked loop circuit comprising:

phase detector means being supplied with said input signal and N phase comparison signals having respectively different N phases and comprising a phase splitting circuit for generating from said input signal N phase split signals having respectively different N phases and N phase detectors for comparing the phases of said N phase split signals with the phases of said N phase comparison signals respectively to produce an error signal of which an alternating current component has a frequency depending on a frequency of said frequency-multiplied signal, where N is an integer equal to or larger than 2:

a loop filter supplied with said error signal from said phase detector means, for filtering off a higher frequency component of said error signal to produce an error voltage;

a voltage controlled oscillator supplied with said error voltage from said loop filter as a control voltage, for producing an oscillating signal as said frequency-multiplied signal, said oscillating signal having a frequency variably controlled depending on said error voltage; and

comparison signal generating means supplied with said oscillating signal from said voltage controlled oscillator, for generating said N phase comparison signals.

4,888,565
APPARATUS FOR GENERATING ULTRASONIC SIGNALS

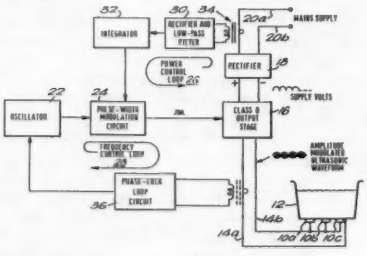
Gordon E. Littleford, Kings Lynn, and Roy F. Underwood, Clifton, both of England, assignors to Kerry Ultrasonics Limited, Hertfordshire, England

Filed Dec. 15, 1988, Ser. No. 284,515

Claims priority, application United Kingdom, Dec. 18, 1987, 8729599

Int. Cl.[4] H03L *7/06*

U.S. Cl. 331—25 **13 Claims**



1. An ultrasonic generator comprising an oscillator, an output stage which is fed from a mains supply, which receives signals from the oscillator and which is arranged to provide an ultrasonic output signal, and power control means comprising sensing means to monitor the mains supply to the output stage and pulse-width modulation means connected to the sensor means and arranged to provide a correction signal to the output stage to maintain the mains supply current or the ultrasonic power output constant for a constant mains supply voltage.

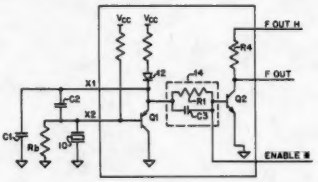
4,888,566
TEMPERATURE COMPENSATED STABLE DUTY CYCLE CRYSTAL OSCILLATOR APPARATUS

Ban S. Bong, Northridge; Francis T. Yu, Conga Park, and Robert Bremer, West Hills, all of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 19, 1989, Ser. No. 340,360

Int. Cl.[4] H03B *5/30*

U.S. Cl. 331—116 R **10 Claims**



1. A temperature-compensated stable duty cycle crystal oscillator apparatus comprising in combination:

a first transistor having an emitter, base and collector,

means for biasing, said biasing means operatively connected between said base and said emitter of said first transistor, said collector of said first transistor being connected to ground,

means for oscillating, said oscillating means operatively connected between ground and said base of said first transistor,

means for temperature compensation, said temperature compensation means operatively connected in series with said emitter of said first transistor,

means for coupling, said coupling means operatively connected to said emitter of said first transistor, and

a second transistor having an emitter, base and collector, said emitter of said second transistor operatively connected to ground, said base of said second transistor operatively connected to said coupling means, said coupling means providing base currents and input impedance to said second transistor for saturating said second transistor and for wave shaping the output signal therefrom, said output signal appearing on said collector of said second transistor.

4,888,567
VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR WITH VARIABLE PHASE FEEDBACK

Philippe Berger; Pierre A. Berland, and Patrick Douziech, all of Villingen-Schwenningen, Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany

Filed Sep. 28, 1988, Ser. No. 250,731

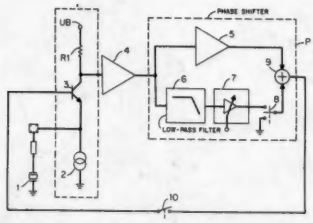
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732906

Int. Cl.[4] H03B *5/36*

U.S. Cl. 331—116 R **2 Claims**

1. A voltage-controlled oscillator comprising: a ceramic piezoelectric resonator having an output voltage; phase shifting means connected to said ceramic piezoelectric resonator

and receiving said output voltage; said phase shifting means having a first branch with amplifier means; a second branch connected in parallel with said first branch and having a low-pass filter connected in series with a controllable amplifier and switching means; said controllable amplifier having an output connected to a first input of said switching means; a source of



reference potential connected to a second input of said switching means; summing means having a first input connected to an output of said switching means; said summing means having a second input connected to said amplifier means of said first branch; said summing means having an output fed back to said ceramic piezoelectric resonator.

4,888,568

LC FILTER

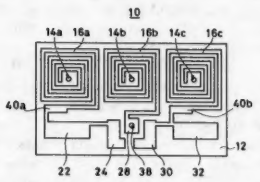
Masahiko Kawaguchi, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Mar. 11, 1988, Ser. No. 166,570

Claims priority, application Japan, Mar. 13, 1987, 62-59764

Int. Cl.[4] H03H *7/12*

U.S. Cl. 333—174 **4 Claims**



1. An LC filter, comprising:

a dielectric base plate;

a plurality of inductance conductors formed on both main surfaces of said dielectric base plate, and forming a plurality of inductors; at least a pair of said plurality of inductance conductors on opposite sides of said base plate being interconnected through said base plate and thereby forming a first inductor;

first and second capacitance electrodes formed on at least one main surface of said dielectric base plate so as to oppose each other, at least one capacitor being formed by said first and second capacitance electrodes;

said at least one capacitor being connected to said first inductor by a first relatively narrow connecting conductor formed on said one main surface of said dielectric base plate and interconnecting said first capacitance electrode of said capacitor with said first inductor; and

first and second additional electrodes formed respectively as an enlarged portion of said first connecting conductor and as an enlarged portion of a second relatively narrow connecting conductor connected to said first inductor on the opposite main surface of said dielectric base plate so that said first and second additional electrodes oppose each other, a trimming capacitor being formed by said first and second additional electrodes, and said trimming capacitor being connected in parallel to said first inductor.

4,888,569

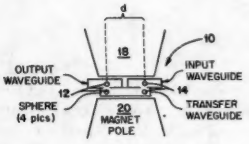
MAGNETICALLY TUNEABLE MILLIMETER WAVE BANDPASS FILTER HAVING HIGH OFF RESONANCE ISOLATION

Dean B. Nicholson, and Robert J. Matreci, both of Santa Rosa, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 23, 1988, Ser. No. 197,556

Int. Cl.[4] H01P *1/207, 1/217*

U.S. Cl. 333—209 **24 Claims**



1. A four-sphere magnetically tuneable integrated waveguide bandpass filter comprising:

an input waveguide having a first axis;

an output waveguide having a second axis longitudinally offset from the first axis;

the input waveguide and the output waveguide being connected by a transfer waveguide, the transfer waveguide having a third axis non-parallel to at least one of the first and second axes;

a first two-sphere waveguide bandpass filter comprising a first variable frequency resonator sphere in the input waveguide placed directly over a first iris below which is positioned a second variable frequency resonator sphere in the transfer waveguide in an over-under configuration; and

a second two-sphere waveguide bandpass filter comprising a third variable frequency resonator sphere in the output waveguide placed directly over a second iris below which is situated a fourth variable frequency resonator sphere in the transfer waveguide in another over-under configuration;

the pair of two-sphere filters being connected by the transfer waveguide;

thereby allowing all four spheres to be situated under the area of the surface of at least one electromagnet pole tip.

4,888,570

CIRCUIT BREAKER

Haruhisa Toda, Fukuyama, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1988, Ser. No. 195,637

Claims priority, application Japan, May 18, 1987, 62-75097; May 18, 1987, 62-75108; May 18, 1987, 62-75109; May 19, 1987, 62-74899

Int. Cl.[4] H01H *9/20*

U.S. Cl. 335—167 **7 Claims**

1. A circuit breaker, comprising:

a case;

a fixed contact, fixedly mounted to said case;

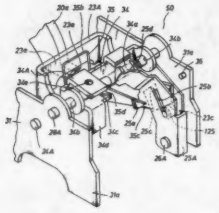
a movable contact, which is pivotally mounted to said case and is movable to be connected with said fixed contact;

opening/closing operation means, which is pivotally mounted to said case for disconnecting/connecting said movable contact from/with said fixed contact and is biased to disconnect said movable contact from said fixed contact;

a latch, which is pivotally mounted to said case and is biased to engage with said opening/closing operation means;

a latch lever, which is pivotally mounted to said case is biased to engage with said latch;

a trip bar, which is pivotally mounted to said case and is biased to engage with said latch lever; and



an automatic trip device for causing said trip bar to disengage from said latch lever when a current greater than a predetermined value flows through said circuit breaker thereby to cause said movable contact to disconnect from said fixed contact wherein a pivot of said trip bar is disposed between a pivot of said latch and a pivot of said latch lever, in a direction of power source side - load side of said case.

4,888,571

COIL MEANS

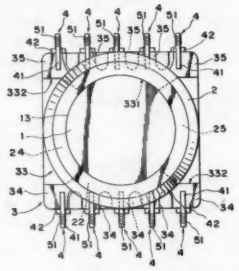
Osamu Kobayashi, Ichikawa; Satoshi Miyagi, Tokyo, and Kazuyoshi Hanabusa, Chiba, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed May 5, 1989, Ser. No. 347,581

Claims priority, application Japan, May 7, 1988, 63-60419

Int. Cl.[4] H01F *15/02*

U.S. Cl. 336—65 **5 Claims**



1. Coil means including a drum core having a drum portion and a pair of flanges provided at the opposite ends of the drum portion, at least one coil wire wound around the drum portion of the drum core, a ring core of a cylindrical configuration placed to encircle the drum core and the coil wire wound around the drum core, a base plate having a surface for supporting one of the ends of said drum core and said ring core, said ring core being formed at said one end with at least one cutout leaving at least one projecting edge at said one end, said base plate being formed at said surface with recess means for receiving the flange at said one end of the drum core and for receiving said projecting edge of the ring core.

4,888,572

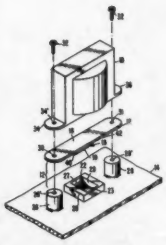
APPARATUS FOR RELIEVING STRAIN ON ELECTRICAL LEAD

Raymond K. Tinley, 319 N. Elmhurst Ave., Mt. Prospect, Ill. 60056

Filed Nov. 22, 1988, Ser. No. 274,889

Int. Cl.[4] H01F *15/02, 15/10*

U.S. Cl. 336—65 **7 Claims**



1. An electrical element and apparatus relieving strain on electrical leads extending from said electrical element comprising:

(a) a base;

(b) means for supporting said electrical element on said base;

(c) means for fixing said leads relative to said electrical element, said means including a clamp having a first clamp member fixed to said base and second clamp member fixed to said element and having a complementary configuration to said first clamp member for clamping said leads therebetween;

(d) said clamp being located beneath said element when fixed to said base;

(e) said first clamp member being a boss having a recess therein, and said second clamp member including a complementary protrusion having a surface parallel with that of said recess; and

(f) said base member including a first post and a second post fixed thereto in spaced relationship, said boss being located between said first and second posts, said protrusion being carried by plate having a first and second plate apertures therein whose centers have axes common with corresponding axes of said posts, and means for securing said plate to said post through said apertures and said clamp with said protrusion extending into said recess for engaging said lead passing therebetween and fixing said lead relative to said electrical element.

4,888,573

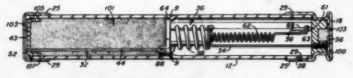
FUSE CONSTRUCTION

Glen A. Dunn, Fairview, N.C., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Dec. 21, 1988, Ser. No. 287,906

Int. Cl.[4] H01H *71/20, 85/04*

U.S. Cl. 337—164 **23 Claims**



1. A fuse, comprising:

a tubular insulating body having a first end and a second end,

a hollow cylindrical insulator having first and second cylindrical ends,

an insulator barrier flange disposed radially about said first

cylindrical end and having a coaxial aperture therethrough;
a conductive metal eyelet having a closed sleeve end portion and a conductive flange portion;
said sleeve portion received within said hollow cylindrical insulator such that said conductive flange portion abuts said second cylindrical end,
said closed end portion crimped over said barrier flange;
a resistance wire coil having a tail end and a radial end disposed around said cylindrical insulator between said conductive flange and said barrier flange.
said barrier flange further including a coil aperture therethrough;
said tail end projecting through said coil aperture,
said radial end disposed on said conductive flange opposite said second cylindrical end;
the assembly of said hollow cylindrical insulator, said barrier flange, said eyelet and said coil forming an insulator assembly;
said insulator assembly disposed in said tube to sector said tube into first and second cavities;
a heater strip having a conductive end and an spring loop end;
a spring having one end thereof retained within said spring loop end;
said spring loop end in electric conductive engagement with said coil radial end adjacent said conductive flange;
a spring tensioning means for engaging said spring in tension in said tubular insulating body;
said spring engaged in tension between said spring loop and said spring tensioning means;
a short circuit strip having a coil end and a conducting end;
said coil end in electrically conductive contact with said coil tail; and
electrically conductive end caps having solder slugs therein disposed on said first and second ends of said tubular insulating body, said heater strip disposed in said first cavity and having said heater strip conductive end disposed in electrically conductive engagement with said end cap on said first end and said short circuit strip disposed in said second cavity and having its conducting end disposed in electrically conductive engagement with said end cap on said second end.

4,888,574

CIRCUIT BOARD MATERIAL AND METHOD OF MAKING

James M. Rice, Santa Monica, and Bruce P. Mahler, Thousand Oaks, both of Calif., assignors to 501 Ohmega Electronics, Inc., Culver City, Calif.

Continuation of Ser. No. 822,371, Mar. 17, 1986, abandoned, which is a division of Ser. No. 738,835, May 29, 1985, Pat. No. 4,808,967. This application Mar. 28, 1988, Ser. No. 173,944
Int. Cl.[4] H01C *1/012*; C25D *3/56*
U.S. Cl. 338—309 **17 Claims**

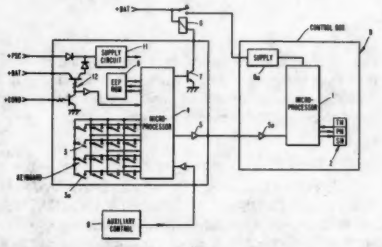
1. A method of electroplating a circuit board substrate with nickel-phosphorous, the method comprising the steps of:
(a) cleaning the substrate; and
(b) electroplating the substrate in a bath consisting essentially of an aqueous solution of a nickel ion source, H_3PO_3 and H_3PO_4, wherein the bath is substantially sulfate and chloride free.

4,888,575

DEVICE HAVING A MODIFIABLE CODE FOR PROTECTING AGAINST THEFT OF AUTOMOBILE VEHICLES

Louis De Vaulx, Versaille, France, assignor to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly/Seine, both of, France

Filed Dec. 30, 1987, Ser. No. 139,800
Claims priority, application France, Dec. 31, 1986, 86 18445
Int. Cl.[4] B60R *25/04*; H01H *27/00*
U.S. Cl. 340—426 **8 Claims**



1. A device for protecting against theft of in particular an automobile vehicle provided with an automatic control for an element of said vehicle such as the engine, said protecting device comprising in combination a keyboard for entering a code of a user of said vehicle, means for converting data entered in said keyboard into an output message containing said user's code, programmable and non-volatile memory means for storing a code for unlocking an electronic control device of said engine, means for comparing said unlocking code stored in said memory means with said user's code contained in said message coming from said keyboard and for unlocking said electronic control device of said engine upon coincidence of said unlocking code contained in said memory means with said user's code contained in said output message, and means for replacing said unlocking code of said control device of said engine by a new unlocking code by action on said keyboard.

4,888,576

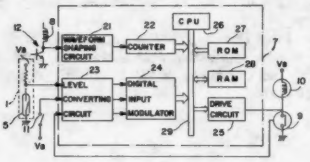
METHOD AND SYSTEM FOR DETECTING THE LEVEL OF ENGINE OIL OF AN ENGINE

Shin'ichi Kubota; Hideyo Miyano, and Hiromitsu Adachi, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 244,579, Sep. 13, 1988, which is a continuation of Ser. No. 921,129, Oct. 21, 1986, abandoned. This application Apr. 12, 1989, Ser. No. 337,137
Claims priority, application Japan, Oct. 21, 1985, 60-234733
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 340—451 **1 Claim**

1. A system for detecting insufficiency of an engine oil of an engine having an engine oil supply passage, comprising:
pressure detection means for detecting whether or not an engine oil pressure in said engine oil supply passage is lower than a predetermined pressure level;
alarming means connected to said pressure detection means, for generating an alarm when it is detected by said pressure detection means, after a starting of the engine, that said engine oil pressure is lower than the predetermined pressure level; and

control means connected to said pressure detection means and said alarming means, for operating said alarming means for a predetermined time period when it is detected by said pressure detection means, upon starting of the



engine, that said engine oil pressure is equal to or higher than the predetermined pressure level, thereby to indicate that the pressure detection means is operating properly and the engine oil pressure is high enough.

4,888,577

SEMI-AUTOMATIC MECHANICAL TRANSMISSION CONTROL DISPLAY AND FAULT INDICATOR

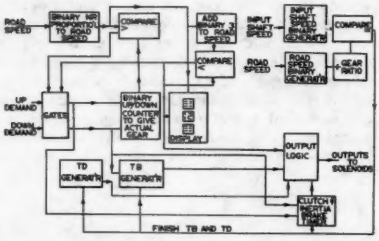
Michael W. Dunkley, Longridge; John E. Stainton, Chorley, and John E. Dunne, Sheffield, all of England, assignors to Eaton Corporation, Cleveland, Ohio

Filed May 2, 1988, Ser. No. 189,278

Claims priority, application United Kingdom, May 14, 1987, 8711329

Int. Cl.[4] B60Q *9/00*

U.S. Cl. 340—461 **7 Claims**



1. A method of (i) displaying the presence and (ii) the identity of a sensed vehicle fault condition in a vehicle equipped with mechanical change gear transmission (**12**), a central processing unit (**38**) for receiving input signals indicative of transmission input shaft (**32**) and output shaft (**36**) rotational speeds, and for processing same according to predetermined logic rules;

to determine the currently engaged gear ratio of said transmission and to determine permissibly engaged gear ratios of said transmission under sensed vehicle operating conditions;

and to issue command output signals to a display (**2**) for displaying the currently engaged gear ratio and also displaying an indication of the permissibly engaged gear ratios, said displaying including:

a first section (**302'''**) displaying alpha-numerical information indicative of the currently engaged gear ratio;

a second display section (**302'**) displaying information indicative of the highest permissible engaged gear ratio; and,

a third display section (**302''**) displaying information indicative of the lowest permissible engaged gear ratio, said method characterized by:

processing said input signals to sense the presence or absence of a fault condition;

upon sensing a fault condition, (i) assigning a predetermined code to the sensed fault, (ii) causing at least one of said first, second and third display sections to display information indicative of the presence of a fault and (iii) causing said first section to display the assigned code.

4,888,578

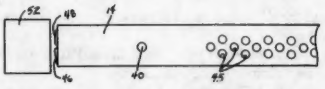
WIRELESS ELECTRONIC ALARM FOR INSTALLATION IN SLIDING DOOR OR WINDOW CASINGS

Timothy D. Conemac, 11315 Montgomery Ave., Granada Hills, Calif. 91344

Continuation-in-part of Ser. No. 125,165, Nov. 25, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,140

Int. Cl.[4] G08B *13/08;* **H01H** *3/16*

U.S. Cl. 340—546 **24 Claims**



1. An alarm device for use with a sliding door or window mounted in a casing, comprising:

a hollow outer tube having a first end and a second end;

an inner tube having a first end and a second end, said first end of said inner tube being located in said outer tube, said second end of said inner tube extending from said second end of said outer tube;

means for adjusting the length of the portion of said inner tube which protrudes from said second end of said outer tube;

means for receiving one or more batteries in said first end of said inner tube;

electrical switch means for triggering said alarm device, said electrical switch means comprising:

a first electrical contact mounted at said second end of said inner tube;

a second electrical contact also mounted at said second end of said inner tube, said second electrical contact being spaced away from said first electrical contact so as not to be in electrical contact with said first electrical contact;

a plastic activating end cap for installation onto said second end of said inner tube, said activating end cap being adapted to fit over said second end of said inner tube in a loose fashion allowing said activating end cap to slide on and off of said second end of said inner tube, said activating end cap having a first position in which it is partially installed on said second end of said inner tube and a second position in which it is fully installed on said second end of said inner tube; and

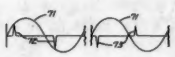
a conductive element located inside said activating end cap, said conductive element being spaced away from said first and second electrical contacts on said second end of said inner tube and said electrical switch means having an open position when said end cap is in said first position, said conductive material being in contact with said first and second electrical contacts on said second end of said inner tube and said electrical switch means having a closed position when said end cap is moved from said first position to said second position by an axial compressive force between said end cap and said first end of said inner tube; an audio transducer located in said inner tube; and

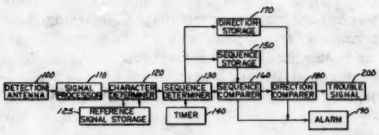
an alarm circuit located in said inner tube, said alarm circuit being electrically connected to said means for receiving batteries, said first and second electrical contacts, and said audio transducer, said alarm circuit causing said audio transducer to emit an alarm signal whenever said electrical switch means has been driven to said closed position.

4,888,579
FALSE ALARM MINIMIZATION AND DIRECTION DETERMINATION METHODS

Walter J. ReMine, and Anthony M. Belka, both of Saint Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Sep. 16, 1988, Ser. No. 245,781
Int. Cl.[4] G08B *13/24*
U.S. Cl. 340—572 20 Claims





1. A method of preventing false alarms in an electronic article surveillance system, comprising:

(a) defining an interrogation zone, comprising alpha and beta portions, by an interrogation antenna and a detection antenna,

(b) detecting a marker, which responds to a signal produced by the interrogation antenna to produce in the detection antenna a first signal with a waveform of a first character as the marker is within the alpha portion of the interrogation zone, and a second signal with a waveform of a second character as the marker is within the beta portion,

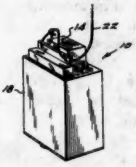
(c) determining if the characters of the waveforms of the first and second signals produced in step (b) are different, and

(d) initiating an alarm if the first and second signals detected in step (b) have waveforms of different character and occur within a predetermined period of time.

4,888,580
CHILD PROTECTOR

Kenneth Distel, 58 W. District Rd., Unionville, Conn. 06085

Filed Oct. 27, 1988, Ser. No. 263,508
Int. Cl.[4] G08B *13/02*
U.S. Cl. 340—573 14 Claims



1. A device for detecting movement of an infant, comprising:

housing means;

alarm circuit means secured to said housing means, said circuit means comprising alarm means and power supply means;

first plate means, secured to said housing means;

switch means for interrupting said power supply means, mounted through said first plate means, said switch means having an open position and a closed position and said switch means being urged into the closed position;

second plate means, removably securable to said first plate means by magnetic attraction so that the switch means is held in the open position when the second plate means is secured to the first plate means and the switch means is allowed to enter the closed position when the second plate means is removed from the first plate means;

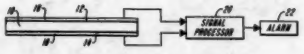
a leash extending from a first end to a second end, said first end being secured to the second plate means; and

attachment means secured to the second end of the leash.

4,888,581
PRESSURE SENSITIVE SECURITY SYSTEM FOR TRACKING MOTION OVER A SURFACE

John K. Guscott, Stow, Mass., assignor to Aritech Corporation, Framingham, Mass.

Filed Apr. 6, 1988, Ser. No. 178,190
Int. Cl.[4] G08B *13/10*
U.S. Cl. 340—666 7 Claims



1. An alarm system comprising:

an area sensor comprising a piezoelectric film having first and second surfaces and electrode means on the first and second surfaces, the piezoelectric film being operative to convert a change in mechanical pressure on the piezoelectric film to an electrical signal on the electrode means, the electrode means on the first surface of the piezoelectric film comprising an array of independently operative electrodes, the array arranged in a pattern which repeats at least once, each electrode in the array being operatively connected to a corresponding electrode in the repeated array;

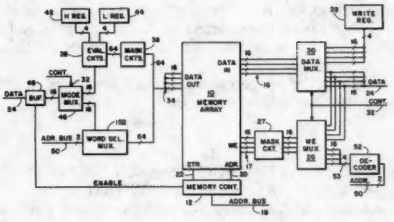
signal processing means including means for detecting the electrical signal generated by the area sensor and further including means for generating an output signal responsive to the electrical signal detected by the detecting means; and

alarm means responsive to the output signal to generate an alarm signal.

4,888,582
APPARATUS FOR STORING MULTI-BIT PIXEL DATA

Charles B. Schnarel, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 673,817, Nov. 24, 1984, abandoned.
This application Feb. 12, 1988, Ser. No. 158,067
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—703 7 Claims



2. An apparatus comprising:

a memory for storing sets of multi-bit pixel color data at addressable locations; and

means coupled to access the memory for changing selected sets of the multi-bit pixel color data to single-bit data, thereby compressing the selected multi-bit data, each selected set of the multi-bit data being changed to a single-

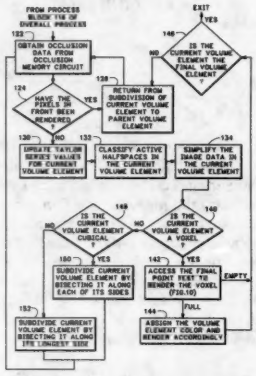
bit data of one or zero, according to the selected data being within or outside predetermined numerical limits.

4,888,583

METHOD AND APPARATUS FOR RENDERING AN IMAGE FROM DATA ARRANGED IN A CONSTRUCTIVE SOLID GEOMETRY FORMAT

Terry J. Ligocki, 1052 E. Woodbury, Pasadena, Calif. 91104, and Peter A. Borgwardt, 8297 SW. Canyon La., Portland, Oreg. 97225

Filed Mar. 14, 1988, Ser. No. 167,923
Int. Cl.[4] G09G 1/00
U.S. Cl. 340—729 **16 Claims**


FROM PROCESS BLOCK 116 OF OVERALL PROCESS
OBTAIN OCCLUSION DATA FROM OCCLUSION MEMORY CIRCUIT
HAVE THE PIXELS IN FRONT BEEN RENDERED
RETURN FROM SUBDIVISION OF CURRENT VOLUME ELEMENT TO PARENT VOLUME ELEMENT
IS THE CURRENT VOLUME ELEMENT THE FINAL VOLUME ELEMENT
EXIT
YES
NO
UPDATE TAYLOR SERIES VALUES FOR CURRENT VOLUME ELEMENT
CLASSIFY ACTIVE HALFSPACES IN THE CURRENT VOLUME ELEMENT
SIMPLIFY THE IMAGE DATA IN THE CURRENT VOLUME ELEMENT
IS THE CURRENT VOLUME ELEMENT CUBICAL
IS THE CURRENT VOLUME ELEMENT A VOXEL
SUBDIVIDE CURRENT VOLUME ELEMENT BY BISECTING IT ALONG EACH OF ITS SIDES
ACCESS THE FINAL POINT TEST TO RENDER THE VOXEL (FIG.10)
EMPTY
FULL
SUBDIVIDE CURRENT VOLUME ELEMENT BY BISECTING IT ALONG ITS LONGEST SIDE
ASSIGN THE VOLUME ELEMENT COLOR AND RENDER ACCORDINGLY

1. In a graphics display system that forms on a display screen a two-dimensional image representing a three-dimensional object, the two-dimensional image being defined by image data comprising mathematical functions that represent plural halfspaces having boundaries that divide an object space into interior object space regions lying inside the halfspaces and exterior object space regions lying outside the halfspaces, at least one of the halfspaces having a nonplanar boundary, a method of rendering the image, comprising:

subdividing the object space into volume elements;

identifying for each volume element an upper bound and a lower bound for values of the mathematical functions representing the boundaries of the halfspaces;

determining which ones of the upper and lower bounds of the mathematical functions lie inside their corresponding halfspaces;

simplifying the image data in accordance with simplification identities to reduce the number of halfspaces, the simplification taking place whenever both the upper and lower bounds correspond to locations lying inside the halfspace; and

rendering the image on the display screen in accordance with the simplified image data.

4,888,584

VECTOR PATTERN PROCESSING CIRCUIT FOR BIT MAP DISPLAY SYSTEM

Hisashige Ando, Yokohama; Makoto Katsuyama, and Takahiro Sakuraba, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 3,844, Jan. 16, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 273,676
Claims priority, application Japan, Jan. 20, 1986, 61-009564
Int. Cl.[4] G09G 1/14
U.S. Cl. 340—747 **4 Claims**

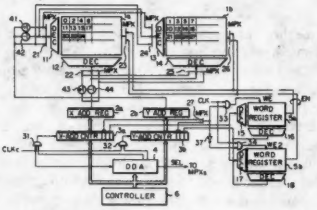
1. A vector pattern processing circuit for a bit map display system including a display unit having a plurality of memory regions in matrix form defined in a plane of said display unit, each memory region forming N×N dots, comprising:

first and second memory means arranged in parallel for storing a plurality of words formed in a matrix, each word having an N×N bits structure, said words in said first memory means corresponding to dot data of a first group of diagonally arranged memory regions of said display unit and said words in said second memory means corresponding to dot data of a second group of diagonally arranged memory regions of said display unit;

first word register means, operatively connected to said first memory means, for storing dot data of said first diagonally arranged memory region group;

second word register means operatively connected to said second memory means for storing dot data of said second diagonally arranged memory region group;

vector pattern generation circuit means for receiving start and end coordinates in said diagonally arranged memory regions defining a processing vector pattern, for generating vector pattern dot data arranged in a plane defined by a horizontal axis and a vertical axis perpendicular to said primary axis in response to a gradient of said vector pattern, and for generating control signals for selecting one word from each other of said first and second memory means in accordance with said gradients of said vector pattern;



bit setting circuit means, operatively connected between said first and second word register means and said vector pattern generation circuit means, for energizing one of said first and second word register means in response to said pattern dot data from said vector pattern generation circuit means, and for setting a bit to said energized word register means in each dot data generation time at said vector pattern generation circuit means, so that each of said pattern dot data is set in the corresponding word register means for storing dot data of the corresponding diagonally arranged memory unit; and

store control circuit means, operatively connected to said first and second memory means and said vector pattern generation circuit means, for receiving said start coordinate and addressing at least one address of a word in one of said memory means defined by said start coordinate and said control signals, so that at least one data set stored in one of said word register means is stored in said word of the corresponding memory means defined by said address.

4,888,585

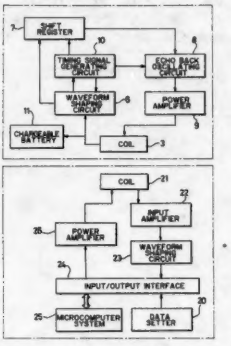
INFORMATION SIGNAL TRANSMITTING DEVICE

Norikazu Kamiya, Toyota, and Katsumi Murai, Anjo, both of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Oobu, Japan

Filed Oct. 27, 1988, Ser. No. 263,523
Claims priority, application Japan, Oct. 30, 1987, 62-276921
Int. Cl.[4] H04Q 9/00
U.S. Cl. 340—825.340 **1 Claim**

1. An information signal transmitting device, comprising a movable unit and a fixed unit between which an information signal is transmitted using one of an electromagnetic wave and

an ultrasonic wave as a transmitting medium, said movable unit including a signal receiving means for converting an information signal transmitted from said fixed unit into a binary signal, a shift register of the serial inputting and serial outputting type for storing an output of said signal receiving means therein, and a signal transmitting means for transmitting to said fixed unit an information signal by one bit which is outputted from said shift register each time an information signal of one bit is inputted to said shift register, said fixed unit including a signal receiving



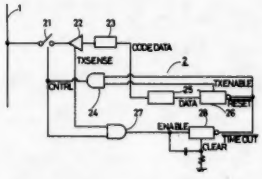
means for converting an information signal transmitted thereto from said movable unit into a binary signal, a signal transmitting means for transmitting an information signal to said movable unit, a data setter on which an information data is to be set, and a sending and reading controlling means for alternately effecting sending of a data to send one bit of the information data set on said data setter to said signal transmitting means of said fixed unit and reading of one bit of an output of said signal receiving means of said fixed unit.

4,888,586

DATA TRANSMISSION SYSTEM

Masahiro Ise, Kashihara; Hidehiko Tanaka, Tenri; Katsuyuki Machino, Nara; Toshiyuki Matsubara, and Teiji Terasaka, both of Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1983, Ser. No. 498,052
Claims priority, application Japan, May 25, 1983, 57-89251
Int. Cl.[4] H04Q *9/00*
U.S. Cl. 340—825.050 **1 Claim**



1. A data transmission system including a plurality of transmission modules connected to a single cable in a multidrop manner, each of said transmission modules comprising:

means for generating codes which do not last at a same level for more than a given time even when a same data is transmitted continuously;

means for monitoring the amount of time that said codes last at the same level;

detector means for generating a fault signal if the amount of time said codes stay at the same level as monitored by said monitoring means exceeds a predetermined time; and

switching means for disconnecting the transmission module from said cable in response to said fault signal;

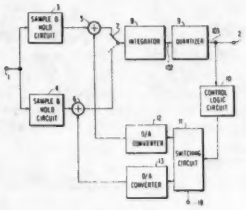
said monitoring means including a timer that is cleared whenever variation takes place in the level and that keeps the time-counting operation while the level of the transmission signal remains unchanged.

4,888,587

OVERSAMPLING A/D CONVERTER WITH TWO CAPICITOR ARRAYS

Yoshiaki Kuraishi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 212,988
Claims priority, application Japan, Jun. 29, 1987, 62-162639
Int. Cl.[4] H03M *1/52*
U.S. Cl. 341—122 **8 Claims**



1. An oversampling A/D converter for sampling an input analog signal at a higher frequency than the frequency band thereof and converting it into a digital signal, comprising:

first and second sample and hold means for alternately sampling and holding said input analog signal during a predetermined first period and generating first and second sampled signals;

first and second D/A converting means for converting first and second digital local signals into corresponding first and second analog local signals, respectively;

first and second subtracting means for determining the respective differences between said first and second sampled signals on the one hand and said first and second analog local signals on the other, and generating first and second difference signals;

selecting means for alternately selecting said first and second difference signals each being selected for a second period equal to half of said first predetermined period;

integrating means for integrating the output signal of the selecting means and generating an integrated signal;

quantizing means for quantizing said integrated signal and generating a quantized signal;

control logic circuit means for generating a digital control signal based on said quantized signal; and

distributing means for distributing said digital control signal alternately to said D/A converters, for a duration equal to said second period, as said first and second digital local signals.

4,888,588

DIGITAL TRIGGER

Daniel M. Castagnozzi, Waltham, Mass., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 17, 1988, Ser. No. 258,423
Int. Cl.[4] H03M *1/12*
U.S. Cl. 341—122 **10 Claims**

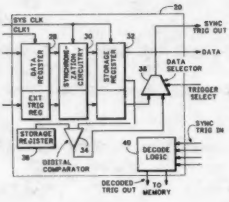
6. A digital trigger for a digitizing instrument, comprising:

a clock circuit having a plurality of separate clocks each generating a clock pulse during a different phase of a

clock period and a system clock for generating a system clock signal defining the clock period;

a plurality of analog-to-digital converters for sampling an analog signal, each of said converters clocked by the signal of a different clock so as to sample the analog signal during each phase of the clock period;

a digital comparator for comparing the output signal of each



analog-to-digital converter to a trigger threshold level to generate a trigger signal at the output of the comparator means if a trigger point occurs on the output signal;

means for evaluating the output signals of the digital comparators to determine the clock phase in which a trigger point occurred; and

means for detecting if a trigger point occurred during a clock period.

4,888,589

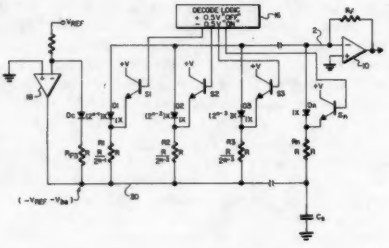
DIGITAL-TO-ANALOG CONVERTER WITH DIODE CONTROL

Derek F. Bowers, Sunnyvale, Calif., assignor to Precision Monolithics, Inc., Santa Clara, Calif.

Filed Jun. 9, 1988, Ser. No. 204,589

Int. Cl.[4] H03M *1/80*

U.S. Cl. 341—153 **10 Claims**



1. A digital-to-analog converter (DAC) ladder segment for producing an output analog signal in response to a multi-digit input digital signal, comprising:

a plurality of step circuits connected to accumulate an analog output current based upon the currents flowing through each of the individual step circuits, each step circuit being rendered either conductive or non-conductive at any particular time in response to respective control signals, said step circuits comprising respective diode networks constructed to conduct desired current levels for their respective step circuits, each diode network including a control diode which enables or disables the flow of current through said network in accordance with the step circuit's control signal, each of said diode networks comprising its respective control diode connected in series with a resistor and a second diode, the control diodes for the different step circuits having substantially equal geometric scalings, said resistors being scaled in resistance and said second diodes being geometrically scaled so that their respective step circuits conduct their desired current levels, and

a plurality of actuating circuits, each actuating circuit being associated with a respective step circuit and connected to apply a control signal to the control diode of its step circuit in response to digital signal input for that step circuit.

4,888,590

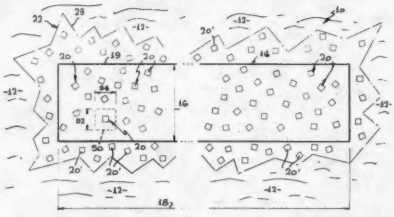
AIRCRAFT RUNWAY

Charles J. Chase, Valencia, Calif., assignor to Lockhead Corporation, Calabasas, Calif.

Filed Jul. 25, 1988, Ser. No. 225,433

Int. Cl.[4] E01C *9/00*; F41H *3/00*

U.S. Cl. 342—3 **18 Claims**



1. A reduced radar detectable runway comprising:

a runway, having a necessary minimum perimeter and an extended portion in an irregular pattern about at least a portion of the minimum necessary perimeter; and

a plurality of holes dispersed across and along the surface of said runway and said extended portion, said holes filled with a dielectric material.

4,888,591

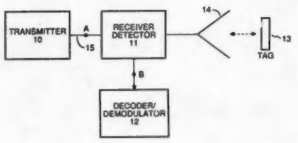
SIGNAL DISCRIMINATION SYSTEM

Jeremy A. Landt, Los Alamos; Alfred R. Koelle, Santa Fe, and David A. Eckhardt, Albuquerque, all of N. Mex., assignors to Amtech Technology Corporation, Santa Fe, N. Mex.

Filed Oct. 6, 1988, Ser. No. 254,254

Int. Cl.[4] G01S *13/80*

U.S. Cl. 342—44 **10 Claims**



1. A system for preferentially receiving modulated backscattered signals based upon a phase shift of the modulation of the phase-modulated carrier signal resulting from the transmission-to-reception time delay, comprising:

a means for phase modulating a carrier with a modulating signal having characteristics which provide unity output when correlated with itself with zero time shift and a substantially lower output level when correlated with itself with a significant time shift;

a means for transmitting said phase-modulated carrier;

a backscatter modulating means located a finite distance from said transmitting means for receiving and modulat-

ing the back-scatter of said phase-modulated carrier signal;

a means for receiving and detecting said modulated backscattered phase-modulated carrier, said detecting means being phase-sensitive and having as a reference signal said transmitted phase-modulated carrier signal, and having as an input signal said modulated backscattered phase-modulated carrier signal, said detecting means providing an output signal whose averaged amplitude is substantially dependent upon the degree of phase correlation of the phase modulation pattern between said input signal and said reference signal; and

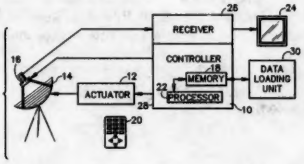
a means for selectively processing the output signal from said detection means only when its averaged amplitude is above a threshold level, whereby only signals from a selected location are processed and the remainder being rendered incapable of being received.

4,888,592

SATELLITE ANTENNA ALIGNMENT SYSTEM

Woo H. Paik; William Fong; Ashok K. Goerge, all of San Diego, and John E. McCormick, El Cajon, all of Calif., assignors to General Instrument Corporation, New York, N.Y.

Filed Sep. 28, 1988, Ser. No. 251,182
Int. Cl.[4] H01Q *3/00*
U.S. Cl. 342—359 **14 Claims**



1. A system for causing an antenna controller for a satellite antenna to automatically determine the alignment position of the antenna for geosynchronous satellites, comprising

means for measuring the alignment position of the antenna for at least two reference satellites; and

means for processing said measurements with stored data indicating the relative positions of the reference satellites and other satellites in accordance with an algorithm to determine the alignment positions of the antenna for the other satellites.

4,888,593

TIME DIFFERENCE OF ARRIVAL GEOLOCATION METHOD, ETC.

Joseph S. Friedman, Baltimore; John P. King, and Joseph P. Pride, III, both of Ellicott City, all of Md., assignors to Signal Science, Inc., Santa Clara, Calif.

Filed Dec. 15, 1987, Ser. No. 147,255
Int. Cl.[4] G01S *1/24*
U.S. Cl. 342—387 **17 Claims**

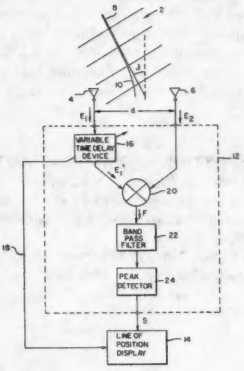
1. Apparatus for determining the time difference of arrival of signals from a transmitter to determine the geographical location of the transmitter relative to a receiver, comprising

(a) first and second antennas spaced apart by a fixed distance for receiving modulated signals having a given baud rate from the transmitter, said first and second antennas generating first and second electrical signals corresponding with the received signals, said second signal being delayed in time from said first signal;

(b) signal processing means connected with the outputs of said first and second antennas for producing an output signal proportional to the time difference between said first and second signals, said signal processing means including

(1) variable time delay means connected with said first antenna for delaying said first signal by a variable time;

(2) means connected with said variable time delay means and with said second antenna for mixing said delayed first signal and said second signal to produce a combined signal output; and



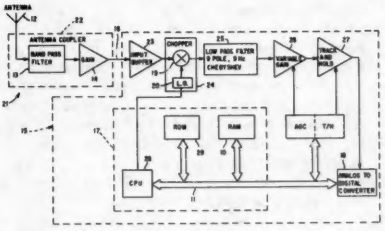
(3) means connected with said mixing means for generating the cyclic crosscorrelation function of said combined signal output in accordance with the transmitted signal baud rate and the variable time delay, whereby as the time delay is varied, the output of said cyclic crosscorrelation function means determines the time difference of arrival of said received signals.

4,888,594

LORAN-C RECEIVER MODULE

Robert S. Sundquist, and Thomas S. McBride, both of Olathe, Kans., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 3, 1989, Ser. No. 331,764
Int. Cl.[4] G01S *1/24*
U.S. Cl. 342—389 **17 Claims**



1. A Loran-C receiver module comprising: antenna coupler means for receiving a received signal from

an antenna; homodyne receiver means connected to said antenna coupler

means for converting a center frequency of an output of said antenna coupler means, said homodyne receiver means comprising, mixter means coupled to input buffer means which receives an output from said antenna coupler means and local oscillator means at the RF carrier frequency and coupled to said mixer means;

minimum rate sampling means coupled to said homodyne receiver means for periodically sampling an output of said

homodyne receiver means, said minimum rate sampling means comprising, low pass filter means which receives an output from said homodyne receiver means and attenuates continuous wave interference, variable gain control means which receives an output from said low pass filter means, track and hold control circuit means which tracks an output from said variable gain control means and holds said output and analog to digital converter means; and,

computer means coupled to said homodyne receiver means and said minimum rate sampling means for processing a sampled output from said minimum rate sampling means and for controlling said Loran-C receiver module.

4,888,595

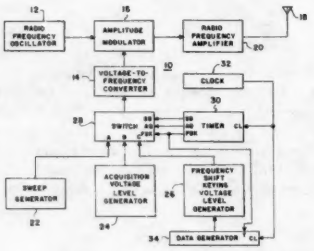
ACQUISITION SIGNAL TRANSMITTER

Morton L. Friedman, Lanham, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 929,870, Nov. 13, 1986, abandoned. This application Feb. 29, 1988, Ser. No. 165,355

Int. Cl.[4] G01S *3/02*

U.S. Cl. 342—457 **14 Claims**



1. A transmitter including:

means for generating a radio frequency carrier;

means for generating an encoded information bearing signal, said means including the amplitude modulation of said carrier;

means for generating an acquisition signal, said means including the amplitude modulation of said carrier by a constant frequency waveform, said acquisition signal providing enhanced signal acquisition and interference rejection capability favoring said information bearing signal in an environment where there may be multiple signals in the same frequency band as said information bearing signal and having substantially all of its transmitted spectral power, in terms of frequency, very close to, but displaced from, the transmitted spectral power of said radio frequency carrier; and

means to sequentially transmit both said acquisition signal and said information bearing signal.

4,888,596

METHOD AND APPARATUS FOR DETERMINING EARTH STATION PARAMETERS SUCH AS RAIN MARGIN, WITH ATTENUATION PADS

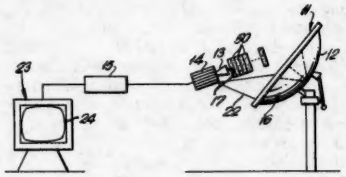
Virgilio D. Conanan, New Milford, N.J., assignor to Home Box Office, Inc., New York, N.Y.

Filed Apr. 19, 1988, Ser. No. 183,596

Int. Cl.[4] H01Q *17/00, 13/00*

U.S. Cl. 343—703 **30 Claims**

1. A method for determining the rain margin of an antenna connected to an operating T.V. set or monitor during a clear and cloudless day, comprising the steps of attenuating the received signal until impulses appear on the screen of said T.V. or monitor; determining the amount of attenuation causing the impulses; and adding delta G/T due to the attenuation to the



amount of attenuation causing impulses to yield said antenna's rain margin.

4,888,597

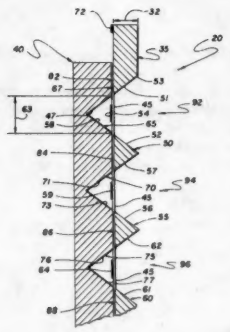
MILLIMETER AND SUBMILLIMETER WAVE ANTENNA STRUCTURE

Gabriel M. Rebiez, and David B. Rutledge, both of Pasadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Dec. 14, 1987, Ser. No. 132,015

Int. Cl.[4] H01Q *1/38, 13/02*

U.S. Cl. 343—778 **4 Claims**



3. An integrated circuit antenna structure for transmitting or receiving millimeter and/or submillimeter wave electromagnetic energy comprising:

a first substrate having a plurality of first cavities extending therethrough, each of said first cavities having slanted sidewalls;

a second substrate bonded to said first substrate and having a plurality of second cavities therein, each of said second cavities having sidewalls slanted such that said second cavities are pyramid shaped and aligned with respective sidewalls of said first cavities to extend said pyramid shape to provide a respective plurality of pyramid shaped horns;

a plurality of electrically transparent membranes mounted between said first and second substrates at said first and second cavities; and

a plurality of antennas mounted on said plurality of membranes and suspended thereby within said horns.

4,888,598

INK WRITING HEAD WITH PIEZOELECTRICALLY EXCITABLE MEMBRANE

Joachim Heinzl, Munich; Manfred Lehmann, Puchheim, and Gunter E. Trausch, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

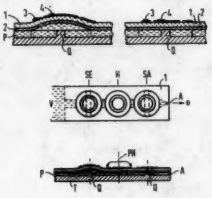
PCT No. PCT/DE87/00229, § 371 Date Oct. 11, 1988, § 102(e) Date Oct. 11, 1988, PCT Pub. No. WO87/07217, PCT Pub. Date Dec. 3, 1987

PCT Filed May 19, 1987, Ser. No. 272,984

Claims priority, application Fed. Rep. of Germany, May 30, 1986, 3618107

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R 19 Claims



1. Ink writing head comprising ink ejection channels (P) and piezoelectric transducer elements (3,4) allocated to the ink ejection channels (P), said transducer elements being supplied with writing fluid via supply lines (V), whereby said transducer elements (3,4) contain an electrically drivable membrane having a first piezoelectrically excitable layer (1) and a supporting layer (2) firmly joined to this excitable layer and the ink is ejected from the ink ejection channels (P) due to excursions of the membrane,

characterized in that the piezoelectrically excitable layer (1) comprises a peripheral region (3) and a central region (4) that are driven such for generating an excursion of the membrane needed for writing operation that the peripheral region (3) is shortened by transversal contraction and the central region (4) is lengthened by dilation.

4,888,599

REAL TIME APPARATUS FOR ADJUSTING CONTRAST RATIO OF LIQUID CRYSTAL DISPLAYS

Craig E. Harwood, and Lyle R. Strathman, both of Cedar Rapids, Iowa, assignors to Rockwell International Corp., Cedar Rapids, Iowa

Filed Oct. 22, 1987, Ser. No. 113,034

Int. Cl.[4] G09G *3/00*

U.S. Cl. 340—812 4 Claims

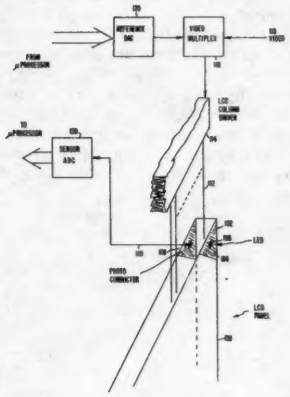
1. An apparatus for improving the image quality of a liquid crystal panel which operates in environments having temperature variations and which uses a plurality of gray scales, comprising:

a. means for producing a predetermined light level through the liquid crystal panel;

b. means for sensing, at a point on the liquid crystal panel, the intensity of said predetermined light level which is transmitted through the liquid crystal panel;

c. means for manipulating the voltage across the liquid crystal panel to produce a plurality of gray scales;

d. means for monitoring the light transmitted through the liquid crystal panel as a function of the voltage across the panel and producing a realtime transmittance output signal; and



e. means for manipulating the gray scale levels in direct response to said output signal.

4,888,600

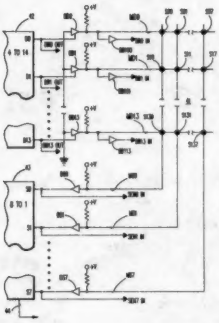
KEYBOAKD ARRANGEMENT WITH GHOST KEY CONDITION DETECTION

Frank E. Anderson, Paris; Christopher J. Gay, Lexington; Scott A. Hightower, Lexington, and Karen G. Luton, Lexington, all of Ky., assignors to International Business Machine Corp., Armonk, N.Y.

Filed Jan. 29, 1988, Ser. No. 149,804

Int. Cl.[4] H03M *11/00*

U.S. Cl. 341—24 6 Claims



1. A keyboard arrangement, for producing key codes representative of key switches which are actuated in the keyboard arrangement, including ghost key condition detection, comprising:

a first group of conductors and a second group of conductors in an array;

means for selectively applying a drive signal to one conductor, in the first group of conductors, at a time;

a group of key switches, each connected to two different conductors comprising a unique combination of a conductor from the first group of conductors and a conductor from the second group of conductors, and each operable when actuated to electrically couple together its associated two different conductors so that the presence of a

drive signal on one said conductor results in the presence of a drive signal on the other said conductor;

sensing means coupled to the conductors in the second group of conductors for sensing drive signals on said conductors;

key code means for converting a sensed drive signal to a key code and for supplying the key code at an output; and

ghost key condition detection means, coupled to the conductors in the first and second groups of conductors, for detecting the simultaneous presence of drive signals on a plurality of conductors in the first group of conductors and of drive signals on a plurality of conductors in the second group of conductors, to inhibit the operation of the key code means.

4,888,601

IMAGE RECORDING APPARATUS AND METHOD

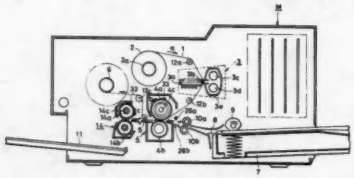
Toshiharu Inui, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1987, Ser. No. 124,833

Claims priority, application Japan, Nov. 27, 1986, 61-280734

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **26 Claims**



1. An image recording apparatus for recording an image onto a medium to be recorded, comprising:

conveying means for conveying a transfer recording medium having a transfer recording layer of which transfer characteristics vary upon application of a first energy and a second energy which is different from said first energy;

a recording section disposed along the conveying path of said transfer medium conveyed by said conveying means, said recording section having a first energy applying means for applying said first energy to said transfer medium and a second energy applying means for applying said second energy to said transfer medium;

a transfer section having a heating means and a pressure applying means used to transfer the image formed on said transfer medium in said recording section on said recording medium; and

a fixing section for fixing the image transferred on said recording medium in said transfer section to said recording medium,

wherein said fixing section applies to said recording medium either or both of heat and pressure greater than heat and pressure applied at said transfer section.

4,888,602

RECORDING APPARATUS WITH BIPOSITIONAL SHEET GUIDING MEMBER

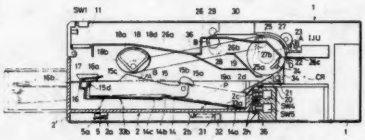
Yoshitaka Watanabe, Tokyo; Yoshiyuki Mizoguchi, Yokohama, and Hiroyuki Hiraga, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 22, 1987, Ser. No. 136,734

Claims priority, application Japan, Dec. 25, 1986, 61-307901; Dec. 25, 1986, 61-307908; Dec. 25, 1986, 61-307909; Dec. 25, 1986, 61-307912

Int. Cl.[4] G01D *5/24*

U.S. Cl. 346—134 **10 Claims**



10. A recording apparatus comprising:

a recording means for recording on a sheet at a recording position;

a platen at the recording position;

platen driving means for rotating said platen to convey the sheet past the recording position;

a sheet loading section for holding a sheet thereon prior to the feeding thereof to the recording position;

sheet feed means for feeding a sheet held by said sheet loading section to said platen;

a sheet guiding member for guiding of the sheet, said sheet guiding member being displaceable between a first position for guiding a sheet fed by said sheet feed member to the recording position prior to recording and a second position for guiding the sheet during recording by said recording means; and

second driving means for driving said sheet guiding member between the first position and the second position independently of the operation of said platen driving means.

4,888,603

LIGHT EMITTING DIODE ARRAY

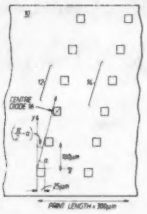
Peter B. Hart, Northampton; George A. A. Chilton, Buckinghamshire, and Richard A. Kirk, Northants, all of England, assignors to The Plessey Company plc, Ilford, England

Filed Sep. 30, 1988, Ser. No. 251,524

Claims priority, application United Kingdom, Sep. 30, 1987, 8722946

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—160 **5 Claims**



1. A light emitting diode array for printing or imaging, formed on a single integrated circuit chip and comprising at least two parallel rows of diodes, each row comprising a plurality of diodes, wherein the diodes have a predetermined width, and the spacing between adjacent diodes in a row is

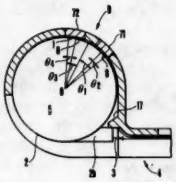
substantially more than the predetermined width for reducing thermal coupling and the spacing between adjacent rows is substantially more than the predetermined width for reducing thermal coupling, wherein the rows are inclined to the intended direction of relative movement between the paper and printer head during a print operation, means for applying electric current pulses to the diodes, and means for delaying application of the current pulses such that during a print operation the diodes are powered by current pulses at instants when the diodes occupy the same print position in the direction of relative movement, for producing a print line perpendicular to the direction of relative movement.

4,888,604

FILM CODE READ OUT DEVICE

Yoichi Tosaka, Kanagawa, and Toru Shoji, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 943,048, Dec. 18, 1986, abandoned.
This application Jul. 18, 1988, Ser. No. 220,471
Claims priority, application Japan, Dec. 26, 1985, 60-295970
Int. Cl.[4] G03B *7/24*
U.S. Cl. 354—21 **4 Claims**



1. A film information read out device for reading out a code of a code pattern portion on a film cartridge, wherein said code pattern portion comprises a conductive part and a non-conductive part, and wherein said device comprises:

(a) a projection provided proximate to an exposure opening end of the film cartridge chamber and projecting toward the film cartridge chamber, said projection regulating a loading position of the cartridge by contact with a film draw out portion of the cartridge when the film cartridge is loaded into the cartridge chamber; and

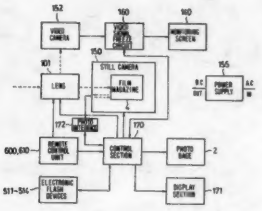
(b) a plurality of contact members being disposed in first and second rows for reading out the code pattern portion, at least one of the contact members being adapted to be brought into contact with a respective corresponding part of the code pattern portion when the film cartridge is loaded into a film cartridge chamber, each one of said contact members being arranged at a side of the film cartridge chamber, the first row of said contact members being disposed so as to contact the code pattern portion at a position offset toward said projection at a predetermined distance from a line dividing the width of the conductive part into two halves when the film cartridge is loaded such that the film draw out portion of the cartridge is in contact with said projection and the second row of said contact members being disposed so as to contact the code pattern portion at a position offset in a direction away from said projection at a predetermined distance from a line dividing the width of the conductive part into two halves when the film cartridge is loaded such that the film draw out portion of the cartridge is in contact with said projection.

4,888,605

PHOTOGRAPHING APPARATUS WITH SELF-MONITORING DEVICE

Hajime Matsumoto, Hiraksta, Japan, assignor to Daicolo Electron Optic Instr. Inc., Tokyo, Japan

Filed Feb. 29, 1988, Ser. No. 161,882
Claims priority, application Japan, Mar. 4, 1987, 62-049494; Mar. 4, 1987, 62-049495; Mar. 4, 1987, 62-049496
Int. Cl.[4] G03B *1/60, 13/00, 17/26, 29/00*
U.S. Cl. 354—75 **13 Claims**



1. A photographing apparatus with a self-monitoring device comprising:

a still camera and a video camera sharing a photographic lens with each other;

a monitoring television device for forming a monitored image thereon from video signals obtained by said video camera;

a film magazine accommodating a film;

a housing member for accommodating therein said still camera, video camera, monitoring television device and said film magazine;

means for freezing the video signals from said monitoring television device in connection with a shutter release operation; and

optical communicating means for communicating information concerning a film winding-up operation, the remaining film amount and the like between said film magazine and the body of said photographing apparatus.

4,888,606

PHOTOGRAPHIC APPARATUS HAVING A SELF-MONITORING DEVICE

Kenshiro Ota, Osaka, and Yoshio Namiki, Yokohama, both of Japan, assignors to Daicolo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 940,367, Dec. 11, 1986, abandoned.
This application Oct. 27, 1988, Ser. No. 265,356
Int. Cl.[4] G03B *15/06*
U.S. Cl. 354—76 **30 Claims**

1. A self-monitoring photographic apparatus comprising:

a single lens reflex camera having a still camera body and a photographic lens;

a TV camera having a CCD as an image forming element;

an optical lens system in optical alignment with said photographic lens for causing a single image of a photographic object to reach two different positions;

a monitor TV for forming a TV image from video signals obtained by said TV camera;

a casing for housing said single lens reflex camera, said TV camera, said optical lens system and said monitor TV;

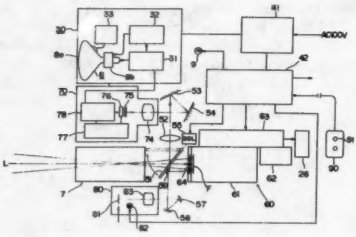
said photographic lens and said TV camera being disposed in parallel with each other and forwardly of said still camera body;

said monitor TV having a screen which is disposed adjacent

and directed towards a same view as said photographic lens and within substantially the same plane as a front face of said photographic lens;

said photographic lens comprising a zoom lens;

said photographic lens directing an image of a photographic object obtained through said photographic lens towards said optical lens system to said still camera body and to said TV camera, with a focusing and a zooming of the



photographic object image directed to said still camera body and to said TV camera being effected commonly by said photographic lens; and

means being provided for laterally inverting said TV image on said monitor TV screen;

whereby the same image as the object image obtained by said still camera body is formed on said monitor TV screen as a laterally-inverted image of said object image in synchronism with a still photography to be effected.

4,888,607

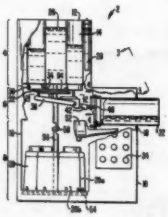
PHOTOGRAPH PROCESSING METHOD AND APPARATUS

William A. Stutz, San Jose; Laszlo A. Kiss, San Ramon, and Joseph D. Rizzi, Los Altos Hills, all of Calif., assignors to Alto Technology, San Jose, Calif.

Filed Sep. 15, 1988, Ser. No. 245,104

Int. Cl.[4] G03D *3/04, 13/04*

U.S. Cl. 354—323 **13 Claims**



1. Apparatus for developing photographic material comprising:

(a) cylindrical, light-tight means for holding said material in a rolled fashion, the means for holding having a drain port;

(b) means for rotating said means for holding from a first position to a second position, said first position arranged to drain a liquid from said means for holding from said drain port, said second position arranged to retain a liquid in said means for holding;

(c) means for rotating said means for holding about its axis while in said second position;

(d) at least a first and a second means for storing at least a first and a second processing fluid, respectively, said means for storing arranged above said means for holding, so as to feed the fluid into said means for holding by gravity, and further comprising first and second valve-operated drain means on said first and second means for storing;

(e) a manifold means, said manifold means operably connected to the valve-operated drain means on said first and said second means for storing, said manifold means draining to said drain port by gravity;

(f) a rotatable table under said means for holding, said rotatable table holding at least a third and a fourth means for storing said first and said second processing fluid, respectively, said rotatable table driven by a rotating shaft;

(g) cam means on said rotating shaft, said cam means opening said valve-operated drain means when aligned therewith;

(h) tubular means oriented to drain liquid from said means for holding to a position above the rotatable table when said means for holding is in the first position;

(i) control means, said control means adapted to orient said elements (a)–(h) in at least the following sequential configurations:

(i) a first configuration in which said first operated drain is opened by said cam, said second valve-operated drain is closed, and said means for holding is in said second position and, thereafter;

(ii) a second configuration in which said first and said second valve-operated drains are closed, and said means for holding is in said second position, and said means for rotating said means for holding about its axis rotates said means for holding and, thereafter;

(iii) a third configuration in which said first and said second valve means are closed, said means for holding is rotated into said first position by said means for rotating from a first position to a second position, and said means for holding drains through said tubular means and into said third means for storing and, thereafter;

(iv) a fourth configuration in which said second operated drain is opened by said cam, said first operated drain is closed and said means for holding is in said second position and, thereafter;

(v) said second configuration and, thereafter;

(vi) a fifth configuration in which said first and said second valve means are closed, said means for holding is rotated into said first position by said means for rotating from a first position to a second position, and said means for holding drains through said tubular means into said fourth means for storing.

4,888,608

PHOTOGRAPHIC DEVELOPING MACHINE

Klaus Kümmerl, Nuremburg, Fed. Rep. of Germany, assignor to Ing. Hermann Kümmerl, Laborgerätebau, Inh. Ing. Klaus Kümmerl, Nuremburg, Fed. Rep. of Germany

Filed Feb. 7, 1989, Ser. No. 307,256

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 3804292; European Pat. Off., Oct. 1, 1988, 88116299.4

Int. Cl.[4] G03D *3/02, 3/08*

U.S. Cl. 354—299 **17 Claims**

1. A photographic developing machine for developing photographic material, comprising:

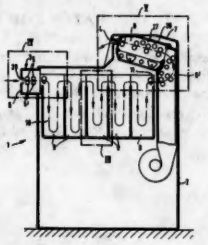
a plurality of tanks to accommodate photographic processing fluids, the tanks being arranged one behind another in a row from an initial tank to a final tank, each tank having an exchangeable rack equipped with planar guide elements and transporting rollers for the photographic material;

a plurality of fluid circulating systems, each fluid circulating system cooperating with a respective tank and including an exchangeable filter, a conduit having a plurality of branches, and a heating member in one of the branches;

a covering frame disposed above the row of tanks, the covering frame having inwardly oriented drip faces;

first means for feeding the photographic material to the

initial tank in the row, the first means including at least one pair of feed rollers and a free-wheeling drive unit; and second means for guiding the photographic material from the final tank in the row, the second means including a



drying box and means for moving the photographic material through the drying box along a drying path, the drying box being disposed above the tanks and being pivotably mounted for movement between a lowered position and a raised position.

4,888,609

AUTOMATIC FOCUS ADJUSTING APPARATUS

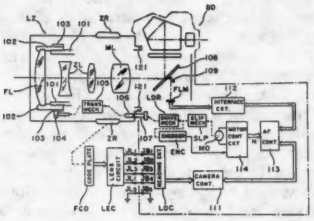
Masataka Hamada, Minamikawachi; Tokuji Ishida, Osaka, and Yasuaki Akada, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 819,865, Jan. 16, 1986, abandoned. This application Aug. 9, 1988, Ser. No. 186,882

Claims priority, application Japan, Jan. 17, 1985, 60-7179; Jan. 24, 1985, 60-11250

Int. Cl.[4] G03B *3/00*

U.S. Cl. 354—402 **7 Claims**



1. An automatic focus adjusting apparatus for adjusting automatically a focus condition of an objective lens, comprising:

photodetecting means of a charge accumulating type for detecting the light intensity distribution of an image of an object to be focused, to produce an accumulated charge signal representing the detected light intensity distribution;

brightness discriminating means for discriminating whether or not the brightness of the image is above a predetermined level;

calculating means for calculating the focus condition of the objective lens in accordance with the accumulated charge signal;

reliability discriminating means for discriminating whether or not the result of the calculation of the calculating means based on the accumulated charge signal is reliable;

lens shifting means for shifting the objective lens along the optical axis thereof, and

control means for controlling the calculating means and the lens shifting means in accordance with the output of the calculating means, the output of the brightness discriminating means, and the output of the reliability discriminating means such that;

if the reliability discriminating means discriminates that the result of the calculation of the calculating means is reliable, the objective lens is shifted by the lens shifting means in accordance with the result of the calculation of the calculating means on the basis of the accumulated charge signals, and

if the reliability discriminating means discriminates that the result of the calculation of the calculating means is not reliable, the objective lens is shifted by the lens shifting means to find a reliable position where a result of the calculation of the calculating means is discriminated to be reliable with repeatedly calculating the focus condition on the basis of the accumulated charge signals produced repeatedly, and, when the reliable position is discriminated to be found, the objective lens is controlled such that:

the objective lens is shifted while repeating the calculation of the calculating means, if the brightness discriminating means discriminates that the brightness of the image is above a predetermined level, and

the objective lens is once stopped, and the calculating means is operated for calculating the focus condition of the objective lens during the stoppage of the objective lens, and after that the objective lens is shifted by the lens shifting means in accordance with the result of the calculation of the calculating means during the stoppage of the objective lens, if the brightness discriminating means discriminates that the brightness of the image is below the predetermined level.

4,888,610

DISPLAY APPARATUS

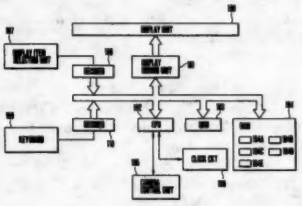
Shinichi Tsujimoto; Kenichiro Amano, both of Tokyo, and Kenji Itch, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,000

Claims priority, application Japan, Oct. 28, 1987, 62-272061

Int. Cl.[4] G03B *17/18, 17/24*; G09G *3/02, 3/04*

U.S. Cl. 354—475 **11 Claims**



1. A display apparatus for a camera, comprising:

first generating means for generating a signal having a certain number of digits for display and representing displaying contents;

second generating means for generating a signal having a certain number of digits for display and representing displayed contents;

a display unit which has a predetermiend number of displayable digits, responds to said first and second generating means, and is adapted to display contents related to signals output from said first and second generating means; and

inhibiting means which responds to at least one of the signals output from said first and second generating means, compares a number of digits for display contained in the output signal with said predetermined number of displayable digits of said display unit, and is adapted to inhibit said

display unit from displaying contents related to the output signal when said number of digits for display contained in the output signal exceeds said predetermined number of displayable digits of said display unit.

4,888,611

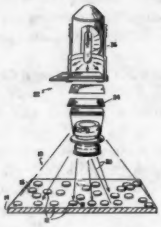
PHOTO-ELECTROMAGNETIC COLOR SEPARATION FOR REPRODUCTION OF COLOR IMAGES

Malvern C. Smallwood, II, 1703 Lewis O'Grey Dr., Saugus, Mass. 01906

Filed Jun. 28, 1988, Ser. No. 212,488

Int. Cl.[4] G03B *27/32, 13/28*

U.S. Cl. 355—32 **23 Claims**



3. A system for converting a continuous tone image on a transparency, negative or the like into a halftone image, comprising:

a plurality of light-responsive elements, each said element adapted to generate a local electromagnetic field proportional to relative intensity of light directed upon that said element, the field of one said element adapted to interact with fields of adjacent said elements,

a support surface upon which said elements are disposed to move to achieve an equilibrium of interacting fields in at least one region of said support surface,

means for directing light through a negative, transparency or the like upon said elements disposed upon said surface in a manner to create a pattern of light and shadow upon said surface to cause each said element to generate a local field proportional to the magnitude of light directed upon that said element, and

means for recording positions of said elements upon achievement of an equilibrium.

4,888,612

PHOTOGRAPHIC PRINTING SYSTEM

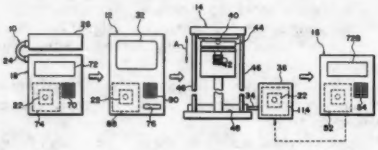
Shohei Yamamoto, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 1, 1988, Ser. No. 200,986

Claims priority, application Japan, Jun. 5, 1987, 62-140902

Int. Cl.[4] G03B *27/72*

U.S. Cl. 355—35 **20 Claims**



1. A photographic printing system, comprising an analyzer adapted to store on a storage medium printing condition data based upon image information obtained from a negative film and, an enlarger adapted to perform printing based upon the data stored on said storage medium, said analyzer storing said printing condition data on said storage medium after correcting them in accordance with at least one of information regarding the specifications of said enlarger and channels of a negative film and a printing paper.

4,888,613

METHOD OF AND APPARATUS FOR PROCESSING EXPOSED PHOTOGRAPHIC FILMS

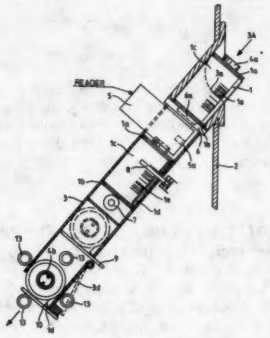
Helmut Zangenfeind, Puchheim, and Reinhart Würfel, Munich, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,398

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737796

Int. Cl.[4] G03B *27/52*

U.S. Cl. 355—41 **26 Claims**



1. A method of processing a series of successive exposed photographic films which are identified by machinereadable information denoting at least the type of film, comprising reading the information for successive films of the series and generating first signals denoting the thus obtained information; a first step of comparing successive first signals with a second signal denoting films of a first type; a second step of comparing at least one third signal denoting films of at least one second type with first signals which are incompatible with said second signal; advancing along a predetermined path the films denoted by first signals which are compatible with said second signal; segregating the films denoted by first signals which are compatible with the third signal; and individually inspecting and classifying the films denoted by first signals which are incompatible with the second and third signals.

4,888,614

OBSERVATION SYSTEM FOR A PROJECTION EXPOSURE APPARATUS

Akiyoshi Suzuki, Tokyo; Hideki Ina, Kawasaki, and Masao Kosugi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 253,895, Oct. 5, 1988, abandoned, which is a continuation of Ser. No. 168,630, Feb. 23, 1988, abandoned, which is a continuation of Ser. No. 54,861, May 27, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,727

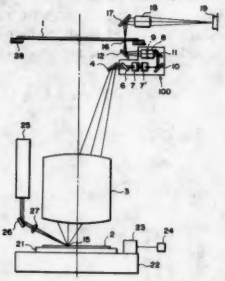
Claims priority, application Japan, May 30, 1986, 61-125102; Jun. 13, 1986, 61-136182

Int. Cl.[4] G03B *27/52, 27/70, 27/28, 27/42*

U.S. Cl. 355—43 **43 Claims**

1. An observation system, usable with a projection lens system for optically projecting a first object upon a second object by use of a light of a first wavelength, for observing the second object by way of the projection lens system and by use of a light of a second wavelength different from the first wavelength, said observation system comprising:

an observation optical system having a lens element and a parallel-surface plate which is inclined with respect to an optical axis of said observation optical system;



wherein said observation optical system is arranged to form an image of the second object on a predetermined image surface and wherein said parallel-surface plate is arranged to substantially/y correct coma caused by the projection lens system.

4,888,615

IMAGE FORMING APPARATUS FOR SELECTIVE COPYING OF SEGMENTED AREAS OF AN IMAGE

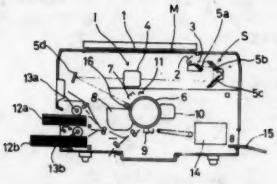
Kazuhiro Araki, and Nobuhiro Mishima, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 26, 1988, Ser. No. 148,697

Claims priority, application Japan, Jan. 27, 1987, 62-17023

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—200 **13 Claims**



1. An image forming apparatus comprising:

original exposure means for exposing an original in a predetermined exposure area, the exposure area being divided into a plurality of specific areas;

specific area designating means for selectively designating one of the specific areas in the exposure area, each of said specific areas further including a plurality of sectional blocks:

sectional block designating means for designating at least one sectional block from the plurality of blocks of a designated specific area; and

image forming means for reproducing an image of the oiriginal corresponding to the sectional blocks except for said one or more designated blocks inside said designated specific area.

4,888,616

IMAGE PROCESSING APPARATUS

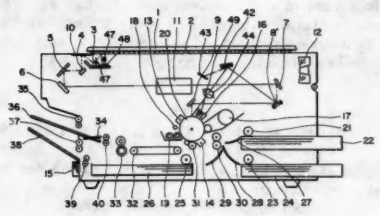
Masanori Nanamura, Kawasaki; Masao Hosaka, and Mutsuhiro Inouye, both of Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 869,688, Jun. 2, 1986, abandoned. This application Aug. 23, 1988, Ser. No. 235,790

Claims priority, application Japan, Jun. 7, 1985, 60-124699; Jul. 2, 1985, 60-145994; Jul. 2, 1985, 60-145995; Jul. 2, 1985, 60-145996; Jul. 2, 1985, 60-145997; Jul. 2, 1985, 60-145998

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—202 **15 Claims**



1. An image processing apparatus comprising:

output means for outputting a first image as optical information;

image forming means for forming an image using a light beam having the optical information from said output means;

light control means having a plurality of electro-mechanical transducer elements, arranged in a light path from said output means to said image forming means;

means for generating second image data; and

drive means for driving said light control means in accordance with the second image data;

wherein said drive means drives said light control means in accordance with the second image data so as to optically combine the first image and an image of the second image data.

4,888,617

SHEET FEEDING MECHANISM FOR AN IMAGE RECORDING DEVICE

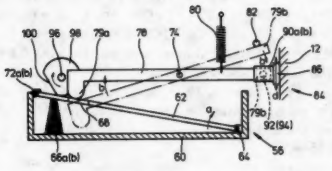
Tugio Okuzawa, Ashigarakami, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 4, 1988, Ser. No. 164,026

Claims priority, application Japan, Mar. 5, 1987, 62-50858

Int. Cl.[4] G03G *21/00*; B65H *7/08, 1/08, 1/16*

U.S. Cl. 355—203 **8 Claims**



1. An image recording device for forming an image on an image receptive member, comprising:

a casing for storing a stack of image receptive members;

delivery means for delivering one image receptive member at a time from said casing;

a movable plate disposed in said casing and displaceable

toward said delivery means as the number of the image receptive members in said casing is reduced;

a detector mechanism for detecting a predetermined amount of displacement of said movable plate; and

transferring means for transferring an image recorded on a photosensitive member to the image receptive member delivered by said delivery means, wherein said detector mechanism comprises a substantially straight arm angularly movably supported and having an end displaceable in response to displacement of said movable plate, and detecting means for detecting a predetermined amount of displacement of said arm comprising a pair of support plates defining a slit therebetween into which an opposite end of said arm can enter, and a light-emitting element and a light detector supported respectively on said support plates in confronting relation.

4,888,618

IMAGE FORMING APPARATUS HAVING AMBIENT CONDITION DETECTING MEANS

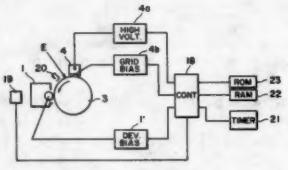
Tadashi Ishikawa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,600

Claims priority, application Japan, Jan. 19, 1987, 62-009561; Jan. 19, 1987, 62-009562; Jan. 19, 1987, 62-009563

Int. Cl.[4] G03G *15/01, 15/08*

U.S. Cl. 355—208 **68 Claims**



1. An image forming apparatus, comprising:

image forming means for forming images on a recording medium, said image forming means being capable of forming the images in different colors;

means for detecting an ambient condition;

means for determining a contrast voltage to be given to said recording medium in accordance with both the ambient condition detected by said detecting means and a color in which the image is to be formed; and

control means for controlling an operating condition of said image forming means in accordance with the contrast determined by said determining means.

4,888,619

MULTI-COLOR IMAGE FORMING APPARATUS FOR FORMING A LATENT IMAGE PATTERN BY USE OF RESIDUAL TONER REMAINING IN A DEVELOPING DEVICE

Takafumi Tottori, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 1, 1988, Ser. No. 152,684

Claims priority, application Japan, Mar. 3, 1987, 62-47933

Int. Cl.[4] G03G *15/00, 21/00, 15/06, 15/01*

U.S. Cl. 355—210 **5 Claims**

1. A multi-color image forming apparatus comprising:

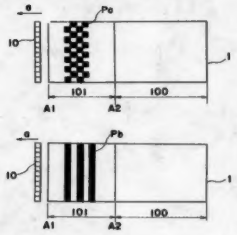
a support member for supporting an electrostatic latent image to be copied, which is rotatably provided so as to be rotated in one direction;

a plurality of developing means which are provided around said support member and contain developers having different colors, respectively;

an image forming means for forming the electrostatic latent image on said support member;

a selector means for selecting one of said developing means;

a pattern forming means which forms a latent image pattern in an image nonforming portion of said support member separately from the electrostatic latent image when selection from an upstream one of said developing means to a downstream one of said developing means in the one direction of rotation of said support member has been effected by said selector means; and



a control means which performs control such that the latent image pattern is so formed on said support member by said pattern forming means as to be located forwardly of the electrostatic latent image as observed in the one direction of rotation of said support member, whereby after the latent image pattern has been passed through the upstream one and the downstream one of said developing means, the electrostatic latent image is developed by the downstream one of said developing means.

4,888,620

PROCESS CARTRIDGE AND IMAGE FORMING APPARATUS USING THE SAME

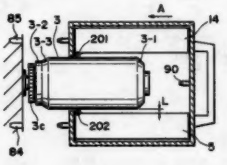
Hitoshi Fujino, Tokyo; Takamasa Sawada, Kawasaki; Hiroo Kobayashi, Tokyo; Osamu Ohuchi; Tadashi Yagi, both of Kawasaki, and Yasuyoshi Hayakawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 241,777, Sep. 7, 1988, abandoned, which is a continuation of Ser. No. 3,462, Jan. 15, 1987, abandoned. This application Mar. 9, 1989, Ser. No. 323,074

Claims priority, application Japan, Jan. 17, 1986, 61-007676; Jan. 23, 1986, 61-012778; Jan. 24, 1986, 61-013090

Int. Cl.[4] G03G *5/00, 15/06, 21/00, 15/048*

U.S. Cl. 355—211 **17 Claims**



1. A process cartridge detachably mountable into a main assembly of an image forming apparatus, comprising:

plural process means for forming an image on a drum-shaped image bearing member mounted for rotation about a rotational axis in the main assembly; and

supporting means for supporting said process means in said process cartridge, said supporting means supporting at least one of said process means for movement toward and away from said image bearing member, interrelatedly with mounting and demounting of said cartridge, when said process cartridge is mounted into or demounted from the main assembly;

wherein when said process cartridge is mounted into or

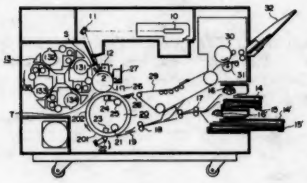
demounted from said main assembly, said process cartridge is moved in a direction of the rotational axis of the image bearing member, and wherein said at least one of said process means is moved toward and away from the image bearing member by contacting a part of said process cartridge and a surface of the image bearing member.

4,888,621

MULTIPLE IMAGE FORMING APPARATUS WITH CHARGER TO PREVENT DISTURBANCE OF ALREADY-TRANSFERRED IMAGES

Akio Ohno, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 82,580, Aug. 7, 1987, abandoned. This application Mar. 22, 1988, Ser. No. 171,220
Claims priority, application Japan, Aug. 11, 1986, 61-189140
Int. Cl.[4] G03G *15/01, 15/00*
U.S. Cl. 355—326 **20 Claims**



1. A multiple image formation apparatus for sequentially transferring color toner images formed on an image carrier onto a single transfer material, comprising:

an image carrier;

means for sequentially forming the color toner images on said image carrier;

transfer material conveying means which is moved to convey the transfer material to a transfer position of said image carrier;

transfer means for applying a transfer bias to said transfer material; and

charging means for charging a surface of said image carrier to have the same polarity as a toner polarity on the transfer material, said charging means charging a surface of said image carrier when the transfer material supported by said transfer material conveying means and having a toner image thereon moves opposite to said image carrier in other than a transfer process.

4,888,622

SUPERCONDUCTOR ELECTRON DEVICE

Akira Ishibashi; Kenji Funato, both of Kanagawa, and Yoshifumi Mori, Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 271,911
Claims priority, application Japan, Nov. 17, 1987, 62-290355
Int. Cl.[4] H01L *39/22*
U.S. Cl. 357—5 **1 Claim**

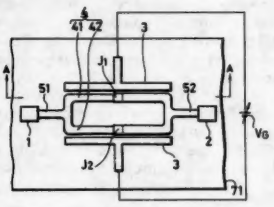
1. A superconducting electron device comprising:

(a) an insulating substrate;

(b) first and second channels formed on said insulating substrate, each formed of a superconducting material and having a Josephson junction therein;

(c) a first electrode connected to each one end of said first and second channels;

(d) a second electrode connected to each another end of said first and second channels; and



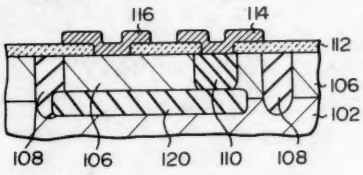
(e) a third electrode applying a voltage to said first and second channels to make potentials at said first and second channels different to each other.

4,888,623

SEMICONDUCTOR DEVICE WITH PN JUNCTION ISOLATION FOR TTL OR ECL CIRCUITS

Hiromu Enomoto, Kawasaki; Yasushi Yasuda, Inagi; Yoshiki Shimauchi, Kawasaki, and Akinori Tahara, Zushi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 876,301, Jun. 18, 1986, abandoned, which is a continuation of Ser. No. 480,586, Mar. 30, 1983, abandoned. This application Oct. 12, 1988, Ser. No. 256,259
Claims priority, application Japan, Mar. 30, 1982, 57-50079
Int. Cl.[4] H01L *29/48*
U.S. Cl. 357—15 **8 Claims**



1. A semiconductor device having an inner circuit element and an outer signal terminal connected thereto, comprising:

a semiconductor substrate;

an epitaxial layer of a first conductivity type formed on said substrate and having a first impurity concentration;

a buried impurity-doped region of the first conductivity type formed between said substrate and said epitaxial layer, said buried impurity-doped region having a second impurity concentration which is higher than the first impurity concentration of said epitaxial layer;

an insulating layer formed on said epitaxial layer and having first and second windows formed therein;

a first electrode formed in said first window and on said epitaxial layer above said buried impurity-doped region and formed of a conductive material, said first electrode formed in said first window forming a Schottky barrier diode with said epitaxial layer and being electrically connected with said inner circuit element;

a first impurity-doped region of a second conductivity type opposite the first conductivity type, said impurity-doped region extending from a top surface of said epitaxial layer to said buried impurity-doped region and in contact with a portion of said first electrode formed in said first window and said buried impurity-doped region, respectively, said first impurity-doped region having a third impurity concentration and forming a pn junction with said buried impurity-doped region; and

a second electrode formed in said second window on said epitaxial layer, above said buried impurity-doped region and remote from said first electrode, said second electrode being formed of a conductive material and forming an ohmic contact with said epitaxial layer, said second electrode acting as an extended electrode of said Schottky barrier diode and said pn junction and being connected to the outer signal terminal, said Schottky barrier diode and said pn junction being electrically connected in parallel between said first and second electrodes, whereby electrostatic breakdown of said Schottky barrier diode due to an extraordinarily high voltage applied from the outer signal terminal is prevented by preferential breakdown of said pn junction.

4,888,624

SEMICONDUCTOR DEVICES EMPLOYING HIGH RESISTIVITY IN-BASED COMPOUND GROUP III-IV EPITAXIAL LAYER FOR CURRENT CONFINEMENT

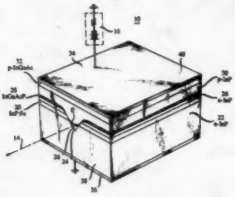
Wilbur D. Johnston, Jr., Mendham; Robert F. Karlicek, Jr., South Plainfield; Judith A. Long, Millburn, and Daniel P. Wilt, Scotch Plains, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 4,919, Jan. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 621,071, Jun. 15, 1984, Pat. No. 4,660,208. This application Apr. 20, 1988, Ser. No. 183,796

The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.

Int. Cl.[4] H01L *33/00*; H01S *3/19*

U.S. Cl. 357—16 **12 Claims**



1. A semiconductor device comprising

a semiconductor body,

means for applying current to said body, and

means for preventing substantial current flow through a region of said body, characterized in that

said preventing means comprises an In-based compound Group III-V epitaxial layer included in said region and having the physical characteristics of an Fe-doped InP-based MOCVD layer.

4,888,625

OPTOELECTRONIC COUPLING ELEMENT, AND METHOD OF MAKING SAME

Ruediger Mueller, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

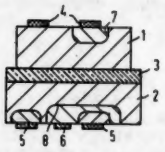
Filed Sep. 22, 1987, Ser. No. 99,578

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633288; Apr. 16, 1987, 3713067

Int. Cl.[4] H01L *31/12, 23/14*

U.S. Cl. 357—17 **10 Claims**

1. An optoelectronic coupler comprising a light-emitting semiconductor device in the form of a transmitter chip, and a light-receiving semiconductor device in the form of a receiver chip, an optical coupling medium being insulative and transparent and fixedly joining together the two chips, each of said two chips having contact terminals on a surface opposite to the optical coupling medium the optical coupling medium being an intermediate layer and providing the sole mechanical binding between transmitter chip, and said receiver chip, the light-emitting semiconductor device, the coupling medium and the



light-receiving semiconductor device being joined together adhesively by stacking directly one on the other wherein the contact terminals are disposed on opposing surfaces of the two chips joined together, and the coupling medium is formed as part of one of the two chips.

4,888,626

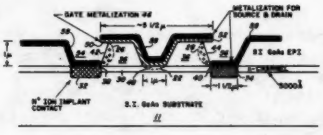
SELF-ALIGNED GAAS FET WITH LOW 1/F NOISE

John E. Davey, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 709,476, Mar. 7, 1985, abandoned. This application Apr. 17, 1987, Ser. No. 39,829

Int. Cl.[4] H01L *29/80*

U.S. Cl. 357—22 **6 Claims**



1. A self-aligned GaAs effect transistor with an active channel which is unaffected by surface charge trapping/emission, comprising:

a channel region of doped GaAs with a first and a second end;

a source region of heavily doped GaAs disposed at said first end of said channel region:

a drain region of heavily doped GaAs disposed at said second end of said channel region:

an epitaxial semi-insulating GaAs layer disposed over said channel region and extending between said first and second ends of said channel region where said source and drain regions are disposed, said semi-insulating GaAs layer having first and second end surfaces near said first and second ends of said channel region, said source and drain regions being uncovered by said semi-insulating GaAs layer, said first and second end surfaces of said semi-insulating GaAs layer being sloped at an angle greater than or equal to 45 degrees relative to said channel region;

a cavity in said semi-insulating GaAs layer exposing a portion of said channel region between said first and second ends of said channel region; and

a gate metallization disposed over said semi-insulating GaAs layer and extending over said semi-insulating GaAs layer and said cavity from said first end surface of said semi-insulating GaAs layer to said second end surface of said semi-insulating GaAs layer and directly contacting said exposed portion of said channel region in said cavity to form a Schottky barrier contact with said portion of said channel region, said gate metallization has a first end

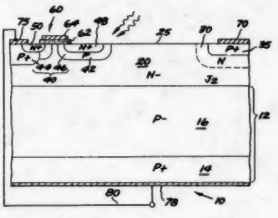
thereof which juts sideward and overhangs said sloped first end surface of said semi-insulating GaAs layer and a second end thereof which juts sideward and overhangs said sloped second end surface of said semi-insulating GaAs layer, said overhanging first and second gate metallization ends acting as masks for maintaining said sloped first and second end surfaces of said semi-insulating GaAs layer open during fabrication and for self-aligning the source and drain regions to a gate region by gate masking.

4,888,627

MONOLITHICALLY INTEGRATED LATERAL INSULATED GATE SEMICONDUCTOR DEVICE

Deva N. Pattanayak, and Bantval J. Baliga, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 19, 1987, Ser. No. 51,427
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.4 **9 Claims**



1. A monolithically integrated lateral semiconductor device having a substantially planar upper surface comprising:

a first layer of one type conductivity;

a second layer of opposite type conductivity forming a portion of said surface of said device;

a first region of opposite type conductivity disposed within said second layer and forming a portion of said surface of said device;

a second region of one type conductivity disposed within said first region and forming a portion of said surface;

a third region of one type conductivity disposed within said second layer and forming a portion of said surface;

a fourth region of opposite type conductivity disposed within said third region forming a first PN junction with said third region and said fourth region forming a portion of said surface;

a fifth region of opposite type conductivity disposed within said third region forming a second PN junction with said third region and said fifth region forming a portion of said surface;

an insulated gate structure associated with a portion of said third region disposed between said fourth and fifth regions, said insulated gate structure, in response to an appropriate bias couples said fourth and fifth regions;

a first electrode disposed in ohmic contact with said second region;

a second electrode disposed in ohmic contact with said third and fifth regions;

a third electrode disposed in ohmic contact with said first layer; and

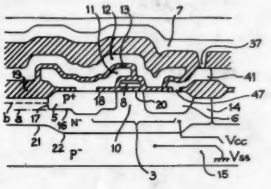
means for coupling for said third electrode to said second electrode.

4,888,628

DYNAMIC MEMORY IN INTEGRATED CIRCUIT FORM

Albert Bergemont, Treis, France, assignor to Eurotechnique, Rousset, France

Filed Feb. 10, 1986, Ser. No. 827,731
Claims priority, application France, Feb. 12, 1985, 85 01974
Int. Cl.[4] H01L *29/78, 27/10;* **G11C** *11/34, 11/40*
U.S. Cl. 357—23.6 **5 Claims**



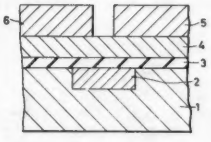
1. A dynamic memory in integrated circuit form for capacitive data storage of the type in which each memory cell comprises an MOS transistor having a given first channel polarity and formed in a well having a reverse second polarity in a semi-conductor substrate of the first polarity, said well having a high implant energy retrograde, wherein said memory comprises means for increasing the junction capacitance of the source-well junction of the transistor, and wherein the means for increasing the junction capacitance comprise unequally doped well regions in which the doping peak is located on the one hand in the immediate vicinity of the drain-source regions of the transistor and on the other hand directly beneath thick oxide regions which separate adjacent memory cells in the memory.

4,888,629

SUPERCONDUCTING DEVICE

Yutaka Harada, Kodaira; Shinichiro Yano, Hachioji; Mutsuko Miyake, Urawa; Ushio Kawabe, Nishitama, and Toshikazu Nishino, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 724,764, Apr. 18, 1985. This application May 31, 1988, Ser. No. 201,332
Claims priority, application Japan, Apr. 19, 1984, 59-77563; Sep. 21, 1984, 59-196830
Int. Cl.[4] H01L *39/22*
U.S. Cl. 357—5 **21 Claims**



1. A superconducting device comprising:

a semiconductor body;

a pair of superconducting electrodes formed on one first surface of said semiconductor body to be separated from one another on said first surface, said superconducting electrodes being coupled by a superconducting weak link through said semiconductor body; and

means for controlling superconducting current flowing through said semiconductor body between said superconducting electrodes, wherein said controlling means is formed adjacent to another second surface of said semiconductor body between said superconducting electrodes which is substantially plane, and wherein said controlling

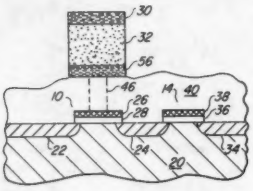
means is insulated from said semiconductor body so as to prevent said superconducting current flowing through said semiconductor body from flowing into said controlling means.

4,888,630

FLOATING-GATE TRANSISTOR WITH A NON-LINEAR INTERGATE DIELECTRIC

James L. Paterson, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 21, 1988, Ser. No. 170,969
Int. Cl.[4] H01L *28/78*; G11C *11/22*
U.S. Cl. 357—23.5 **8 Claims**



1. A method of operating a non-volatile memory cell, said non-volatile memory cell having a ferroelectric material disposed over a channel region which is disposed between first and second diffused regions to form a transistor, and a control gate disposed over said ferromagnetic material, comprising the steps of:

writing the memory cell to a first state by applying a write potential to said control gate having a first polarity relative to said first diffused region, so that the ferroelectric material polarizes into a state having a low value of capacitance per unit area, or to a second state by applying a write potential to said control gate having a second polarity relative to said first diffused region, said second polarity opposite to said first polarity, so that the ferroelectric material polarizes into a state having a high value of capacitance per unit area relative to said first state; and

reading the memory cell by applying a read potential to said control gate, said read potential having a magnitude selected so that when said memory cell is in said first state said transistor does not substantially conduct between said first and second diffused regions, and so that when said memory cell is in said second state said transistor substantially conducts between said first and second diffused regions.

4,888,631

SEMICONDUCTOR DYNAMIC MEMORY DEVICE

Daisuke Azuma; Yoshiji Ohta, and Shinichi Tanaka, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 1,953, Jan. 8, 1987, abandoned. This application Nov. 3, 1988, Ser. No. 267,679
Claims priority, application Japan, Jan. 17, 1986, 61-8575; Jan. 17, 1986, 61-8576; Jan. 21, 1986, 61-11542; Feb. 5, 1986, 61-24577
Int. Cl.[4] H01L *27/10*; G11C *11/40*
U.S. Cl. 357—23.6 **5 Claims**

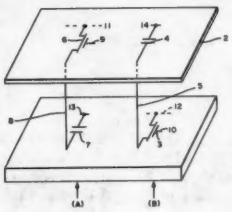
1. A semiconductor dynamic memory device of three-dimensionally stacked structure comprising

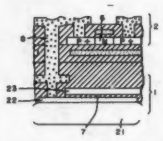
a first active layer which is flat and is formed on a single crystalline silicon substrate,

a second active layer which is flat and is obtained by melting polycrystalline silicon by irradiation on an insulative layer which electrically insulates said first active layer from said second active layer, and

throughholes connecting said active layers across said insulative layer,

each of said active layers comprising single crystalline active element areas which serve to have transistors formed therein, separation areas which individually insulate said active element areas and passive element areas which serve to have plane capacitors, said active element areas and said separation areas having selected widths, PMOS, NMOS or CMOS field effect transistors being formed in





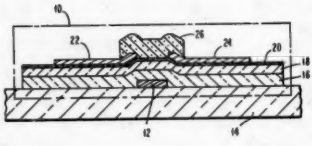
said active element areas of each of said active layers, plane capacitors being formed in said passive element areas of each of said active layers, each of said transistors in said first active layer being connected to one of said plane capacitors in said second active layer through one of said throughholes and each of said transistors in said second active layer being connected to one of said plane capacitors in said first active layer through another of said throughholes.

4,888,632

EASILY MANUFACTURABLE THIN FILM TRANSISTOR STRUCTURES

Ivan Haller, Chappaqua, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 4, 1988, Ser. No. 140,699
Int. Cl.[4] H01L *45/00, 27/12, 29/78*
U.S. Cl. 357—23.7 **8 Claims**



1. A thin film transistor comprising:

a transparent substrate,

a gate electrode formed on said substrate,

at least one transparent insulating layer formed on said substrate and gate electrode having a refractive index different than said substrate and a thickness dimension chosen

so wave components of lithographically active light transmitted through said transparent substrate is reflected at interfaces of said transparent insulating layer and interferes destructively to minimize the reflectance and to maximize the transmission of said lithographically active light,

an amorphous semiconductor layer formed on said transparent insulating layer, and

source and drain electrodes disposed on said semiconductor layer and self aligned with said gate electrode.

4,888,633

CHARGE TRANSFER DEVICE HAVING A BURIED TRANSFER CHANNEL WITH HIGHER AND LOWER CONCENTRATIONS

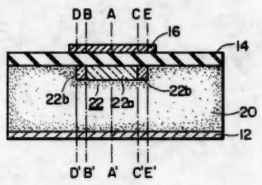
Yasuaki Terui, Osaka, Japan, assignor to Matsushita Electric Industrial Company, Ltd., Japan

Filed Jun. 16, 1981, Ser. No. 274,293

Claims priority, application Japan, Jun. 17, 1980, 55-82631

Int. Cl.[4] H01L *29/78;* G11C *18/28*

U.S. Cl. 357—24 9 Claims



1. A charge transfer device comprising a body of semiconductor having a first region of a given conductivity type and a second region of an opposite conductivity type which is formed below a major surface of said semiconductor body, said second region comprising a section of lower impurity concentration and a section of higher impurity concentration in a lateral peripheral area of said second region, an insulative layer formed on a major surface of said semiconductor body, and a common electrode formed on the opposite surface of said semiconductor body.

4,888,634

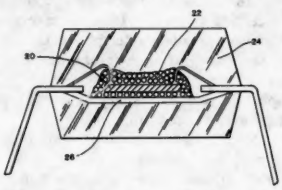
HIGH THERMAl RESISTANCE BONDING MATERIAL AND SEMICONDUCTOR STRUCTURES USING SAME

Chong K. Lai, Santa Clara, and Robert C. Dobkin, San Jose, both of Calif., assignors to Linear Technology Corporation, Milpitas, Calif.

Continuation of Ser. No. 77,170, Jul. 24, 1987. This application Feb. 3, 1989, Ser. No. 307,234

Int. Cl.[4] H01L *23/28, 39/02, 23/02*

U.S. Cl. 357—72 5 Claims



1. A semiconductor structure combination in which a uniform temperature is provided throughout a semiconductor chip, said combination comprising a supporting substrate for said chip, and a bonding material between and in direct contact with said chip and said substrate, said bonding material including a binder and high thermal resistance material in the form of sieved particles of generally uniform size with diameters of at least two mils, said particles being dispersed throughout said binder and providing uniform spacing and uniform thermal insulation between said chip and said substrate.

4,888,635

ILLUMINATING APPARATUS AND RECORDING APPARATUS MAKING USE OF THE SAME

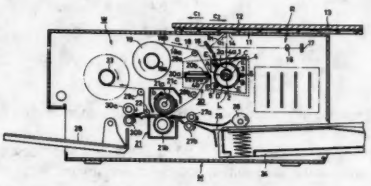
Toshiaki Harada, and Tadashi Yamamoto, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 11, 1988, Ser. No. 154,892

Claims priority, application Japan, Feb. 19, 1987, 62-034534; Jan. 22, 1988, 63-010851

Int. Cl.[4] H04N *1/16*

U.S. Cl. 358—75 23 Claims



1. An illuminating apparatus for illuminating object with lights comprising:

a rotary member having four types of fluorescent materials, two of which are for emitting lights which are used for recording while the remaining two are for emitting lights which are used for reading;

driving means for driving said rotary member;

lighting means for causing said fluorescent materials to emit lights; and

a plurality of light paths for guiding said light from said fluorescent materials to a plurality of objects.

9. A recording apparatus capable of reading an image information and recording an image on a recording member in accordance with the read image information, comprising:

a rotary member having a plurality of types of fluorescent materials;

driving means for driving said rotary member;

lighting means for causing said fluorescent materials to emit lights;

image reading means capable of reading an image by means of an illuminating light;

image forming means capable of forming an image on said recording member by means of an illuminating light;

a first illuminating light path through which the light emitted from one of said fluorescent materials is guided to said image reading means; and

a second illuminating light path through which the light emitted from one of said fluorescent materials is guided to said image forming means.

4,888,636

IMAGE REPRODUCING SYSTEM

Shunichi Abe, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 586,774, Mar. 6, 1984, abandoned. This application Mar. 15, 1989, Ser. No. 323,162

Claims priority, application Japan, Mar. 8, 1983, 58-37709; Mar. 8, 1983, 58-37710; Mar. 8, 1983, 58-37711

Int. Cl.[4] G03F *3/08*

U.S. Cl. 358—80 9 Claims

1. A color image processing apparatus comprising:

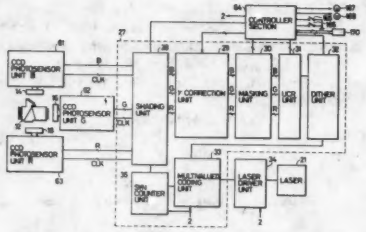
generating means for generating a predetermined pattern

signal with a plurality of tonality levels, including halftones, for each of a plurality of color components;

process means for forming a color image, including halftones, represented by the pattern signal;

discriminating means for discriminating a reproduction condition of tonality, including halftones, for each color component, in accordance with the color image being formed by said process means; and

modifying means for modifying the tonality-processing, for each color component, of the color image being formed by said process means in accordance with the result of discrimination by said discriminating means.



4,888,637

MULTIPLE SEMICONDUCTOR HEAT SINK/MOUNTING ASSEMBLY

Min Sway-Tin, Troy; Daniel P. Merchant, Utica, and Thomas J. Mangliers, Grosse Pointe Woods, all of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jan. 15, 1988, Ser. No. 144,208

Int. Cl.[4] H01L *23/34, 23/40*

U.S. Cl. 357—81 **17 Claims**

1. A heat sink assembly comprising:

a housing including a base adapted to be positioned adjacent to a circuit board and defining a plane, one or more walls unitary with said base, said oneor more walls movable from a first position to a second position wherein said one or more walls are substantially transverse to said base, one or more cavities in said one or more walls adapted to receive one or more electrical components when said one or more walls are in said first position, said one or more electrical components including heat sink tabs;

means for dissipating heat from said one or more electrical components to ambient, said heat dissipating means coupled with said housing and said electrical components heat sink tabs such that said one or more electrical components are received in said one or more cavities when said one or more walls are in said second position so that said one or more electrical components are enclosed by said housing and said heat sink tabs transfer heat from said electrical components to said heat dissipating means; and

means for coupling said assembly with the circuit board or the like.

4,888,638

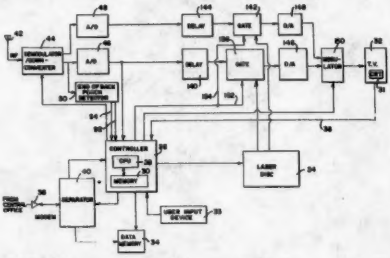
SYSTEM FOR SUBSTITUTING TELEVISION PROGRAMS TRANSMITTED VIA TELEPHONE LINES

Jerry W. Bohn, Barrington, Ill., assignor to A. C. Nielsen Company, Northbrook, Ill.

Filed Oct. 11, 1988, Ser. No. 255,836

Int. Cl.[4] H04H *9/00*

U.S. Cl. 358—84 **68 Claims**



25. A system for substituting on a cathode ray tube display in a household a series of frames of stored video information for a series of frames of transmitted video information having an identification code, comprising, at the household:

means for receiving said transmitted video information;

means for storing a series of frames of substitute video information;

means for detecting an identification code of said transmitted video information; and

means for selectively coupling said stored video information and said transmitted video information to said cathode ray tube display, said coupling means being responsive to the detection of a predetermined identification code of said transmitted video information to couple said stored video information to said television to substitute said stored video information for said transmitted video information.

44. A system for substituting on a television a television program transmitted over a telephone line for a scheduled television program having an identification code, comprising:

means for receiving a scheduled television program;

means for interfacing with a telephone line to receive a substitute television program transmitted over said telephone line;

means coupled to said interfacing means for storing said substitute television program;

means for detecting an identification code of a scheduled television program;

means coupled to said receiving means and said storing means for selectively coupling a scheduled television program or a stored television program to said television; and

means responsive to said detecting means for controlling said coupling means to couple a substitute television program from said storing means to said television in response to the detection of a predetermined identification code.

4,888,639

ENDOSCOPE APPARATUS HAVING INTEGRATED DISCONNECTABLE LIGHT TRANSMITTING AND IMAGE SIGNAL TRANSMITTING CORD

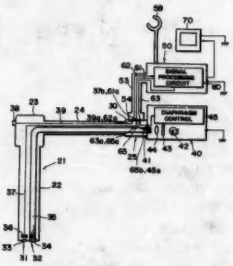
Hisao Yabe, and Koji Takamura, both of Hachioji, Japan, assignors to Olympous Optical Co., Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 197,074

Claims priority, application Japan, May 22, 1987, 62-125154; Sep. 9, 1987, 62-227209; Feb. 2, 1988, 63-22268

Int. Cl.[4] A61B *1/04;* H04N *7/18*

U.S. Cl. 358—98 **28 Claims**



1. An endoscope apparatus comprising:

an endoscope having an elongate insertable part having an observing window and illuminating window in the tip part; and image forming optical system provided at said observing window within the tip part of said insertable part and forming an object image; and illuminating light transmitting means inserted through said insertable part, opposed at the exit end to said illuminating window and emitting an illuminating light out of said illuminating window; and imaging means for imaging the object image formed by said image forming optical system; and a first signal transmitting means connected to said imaging means;

a light source apparatus feeding the illuminating light to said illuminating light transmitting means;

an imaging controlling apparatus controlling said imaging means;

an integrating means integrating the entrance end of said illuminating light transmitting means and the base end of said first signal transmitting means;

connecting parts provided at the entrance end of said illuminating light transmitting means and at the base end of said first signal transmitting means;

a first connecting means removably connecting the entrance end of the illuminating light transmitting means in said connecting part to said light source apparatus;

a second signal transmitting means extended from said imaging controlling apparatus and connected to said first signal transmitting means; and

a second connecting means removably connecting the base end of the first signal transmitting means in said connecting part and the end of said second signal transmitting means with each other.

4,888,640

REFRESH SYSTEM FOR DIGITAL SIGNALS

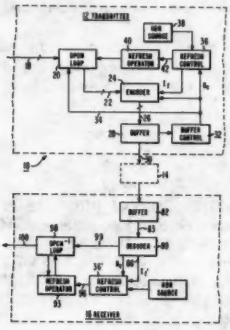
Alfonse A. Acampora, Staten Island, N.Y., and Richard M. Bunting, Robbinsville, N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed May 16, 1988, Ser. No. 194,656

Int. Cl.[4] H04N *7/37*

U.S. Cl. 358—133 **22 Claims**

1. In a DPCM communication system including a transmitter for transmitting a plurality of frames of a compressed digital encoded information signal over a channel to a receiver, the transmitter including a DPCM loop which produces an error signal representing the differences between a predicted signal and a current PCM signal having the same spatial position in successive frames, each frame comprising a plurality of S lines, said receiver including an inverse DPCM loop for adding a current predicted signal, formed from a prior decoded error information signal, to a current decoded error information signal to produce a reconstituted signal, the signal in the inverse DPCM loop tending to become corrupted upon loss of said current decoded error information signal, the combination therewith comprising:



refresh means for periodically refreshing selected ones of said lines at the receiver in a given sequence with transmitted PCM data for a plurality of frames over a refresh cycle wherein in each cycle each scan line of a frame is refreshed.

4,888,641

EXTENDED DEFINITION WIDESCREEN TELEVISION SYSTEM USING PLURAL SIGNAL TRANSMISSION CHANNELS

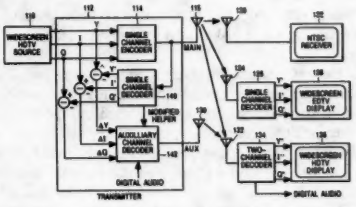
Michael A. Isnardi, Plainsboro; Terrence R. Smith, Westmont; Jack S. Fuhrer, Princeton Junction, all of N.J., and Barbara J. Roeder, Point Pleasant, Pa., assignors to General Electric Company, Princeton, N.J.

Filed Oct. 3, 1988, Ser. No. 252,340

Claims priority, application United Kingdom, Feb. 29, 1988, 8804720

Int. Cl.[4] H04N *7/04, 7/08*

U.S. Cl. 358—141 **10 Claims**



1. A system for generating encoded main and auxiliary signals representing a high-definition widescreen image, comprising:

a source of input video signal representing said high-definition widescreen image having a level of detail that is substantially greater than that of a conventional video image;

first signal encoding means, coupled to said source of input video signal for generating said encoded main video signal

representing an enhanced image having a level of detail that is greater than that of a conventional video image but less than that of said high-definition widescreen image;

decoding means, coupled to said first signal encoding means for decoding said encoded main video signal to generate a decoded main video signal;

signal differencing means, coupled to said decoding means, for generating a difference signal representing the difference between said input signal and said decoded main video signal;

second signal encoding means, coupled to said signal differencing means, for generating said encoded auxiliary video signal representing said difference signal.

4,888,642

VIDEO SIGNAL PROCESSOR

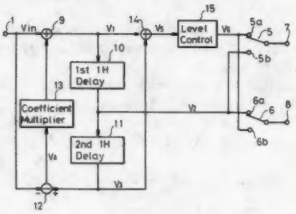
Sumio Kato, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,336

Claims priority, application Japan, Nov. 7, 1987, 62-281735

Int. Cl.[4] H04N *5/14, 11/18, 11/12, 9/47*

U.S. Cl. 358—160 **4 Claims**



1. A video signal processing circuitry which comprises:

a first arithmetic circuit adapted to receive a line sequential signal including a plurality of alternating signals of a frequency equal to one horizontal period;

a first 1H delay circuit for delaying an output from the first arithmetic circuit for a length of time equal to one horizontal period;

a second 1H delay circuit for delaying an output from the first 1H delay circuit for a length of time equal to one horizontal period;

a second arithmetic circuit adapted to receive the line sequential signal and the output from the second 1H delay circuit;

a coefficient multiplier interposed between the first and second arithmetic circuit for varying the level of the output from the second arithmetic circuit according to a predetermined coefficient, the line sequential signal, which has been corrected in reference to the level of each of the line sequential signal and the output from the second 1H delay circuit and the predetermined coefficient, being outputted from the first arithmetic circuit;

an adder for summing the output from the first arithmetic circuit and the output from the second 1H delay circuit;

a level control circuit for controlling the level of an output from the adder; and

a switching device for sequentially providing an output from the level control circuit to first and second output terminals one for each horizontal period and also for sequentially providing the output from the first 1H delay circuit to the second and first output terminals one for each horizontal period.

4,888,643

SPECIAL EFFECT APPARATUS

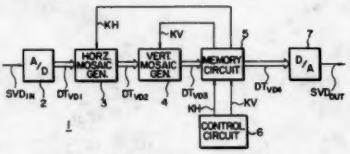
Susumu Kusakabe, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 167,364

Claims priority, application Japan, Apr. 17, 1987, 62-94883

Int. Cl.[4] H04N *5/262, 9/74*

U.S. Cl. 358—183 **7 Claims**



1. A special effect apparatus comprising:

means for receiving an input digital, video signal;

a latch circuit for latching the input digital video signal for a predetermined time; and

a control circuit connected to said latch circuit and serving to control the latch time, said control circuit including a memory circuit for storing the latch data at predetermined picture display positions.

4,888,644

TELEVISION CAMERA SYSTEM HAVING DIFFERENTIATED ILLUMINATION BETWEEN FIELDS

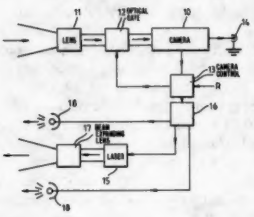
Thomas B. Wilson, Edinburgh, Scotland, assignor to Ferranti International Signal plc, Cheshire, England

Filed Nov. 16, 1988, Ser. No. 271,687

Claims priority, application United Kingdom, Nov. 17, 1987, 8726874

Int. Cl.[4] H04N *5/30*

U.S. Cl. 358—209 **11 Claims**



1. A television system which includes a raster scan television camera, a first source of illumination operable to provide pulsed illumination of a scene to be viewed by the camera, a second source of illumination operable to provide constant illumination of the scene, illumination control means operable to activate the first source to provide a pulse of illumination prior to the commencement of each alternate field period of the television raster scan cycle, camera control means operable to enable the television camera to provide, during each of said alternate field periods, a first video signal representing the scene illuminated by the first source at a predetermined time after the pulse of illumination and, during each other alternate field period, to provide a second video signal representing the scene illuminated by the second source throughout the entire field period, and a video output terminal to which the first and second signals are applied.

4,888,645

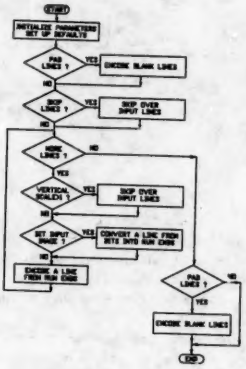
METHOD FOR ENCODING AND DECODING A DIGITAL IMAGE

Joan L. Mitchell, Ossining; Karen L. Anderson, Peekskill, and Gerald Geortzel, White Plains, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 841,483, Mar. 19, 1986, Pat. No. 4,728,318, which is a continuation-in-part of Ser. No. 571,239, Jan. 16, 1984, abandoned. This application Oct. 21, 1987, Ser. No. 111,957

Int. Cl.[4] H04N *7/12*

U.S. Cl. 358—261.1 33 Claims



1. A method for encoding a binary digital image constituted by strings of bits of one or the other binary value, comprising the steps of:

dividing said image into lines of bits containing digital information indicative of said binary values;

representing the digital information on each of said lines as a list of run ends, each list being indicative of the respective offsets from the beginning of

a given line to the last bit in each string of bits of identical value in said given line; and

encoding said line representations by the steps comprising:

testing each run end on a given line for a predetermined relationship with another run end on at least one adjacent line;

generating directly a reference code word representative of said predetermined relationship for each successful test;

generating a run code word for the difference between said run end and the immediately preceding run end on the same line for each case where no predetermined relationship is found; and

merging said reference code words and said run code words generated by the above steps to form an encoded data stream; and

repeating said representing and encoding steps on other image lines to code the lines of the image in sequence.

4,888,646

OPTIMAL IMAGE-QUALITY SELECTION APPARATUS

Tetsuo Umeda, and Fumihiko Sugiura, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jan. 25, 1989, Ser. No. 301,853

Claims priority, application Japan, Jan. 29, 1988, 63-18823

Int. Cl.[4] H04N *1/40*

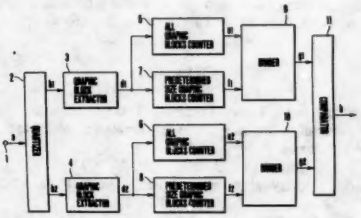
U.S. Cl. 358—464 2 Claims

1. An optimal image-quality selection apparatus comprising:

means for quantizing a signal representing an image, obtained from a scanner, to output two or more video signals representing the image by different depth levels;

means for detecting and counting all the graphic blocks included in each of the two or more video signals, the graphic block being defined as a chain of dots in the image;

means for detecting and counting the number of graphic blocks having a predetermined size in each of the two or more video signals;



means for calculating a ratio of the number of graphic blocks having the predetermined size to the number of the all graphic blocks included in each of the two or more video signals, respectively; and

means for selecting a largest one out of the ratios corresponding to the two or more video signals to output a signal representing that a depth level corresponding to the largest ratio is optimal.

4,888,647

IMAGE RECORDING APPARATUS WITH IMPROVED SOS DETECTION

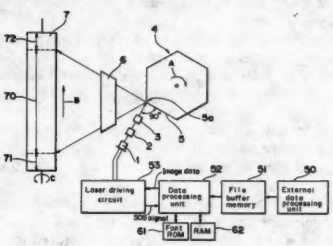
Kanji Wada, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 286,453, Dec. 19, 1988. This application Mar. 14, 1989, Ser. No. 323,276

Claims priority, application Japan, Dec. 21, 1987, 62-324808; Dec. 21, 1987, 62-324809

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—474 13 Claims



1. An image recording apparatus comprising:

a laser light source for generating a primary beam for scanning and a secondary beam for monitoring the light amount thereof which has a light detecting means therein, said light detecting means detecting said light amount of the secondary beam usually;

a photoconductor means for forming a latent image thereon;

a deflecting means having at least one deflecting surface for deflecting said primary beam from said laser light source to scan it on said photoconductor means, said deflecting means and said laser light source being arranged in such a manner that said primary beam is reflected by said deflecting means toward said laser light source at a moment before starting the scan; and

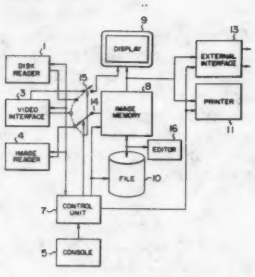
a distinguishing means for distinguishing the output signal of said light detecting means obtained when only the secondary beam is incident on said light detecting means from the output signal of said light detecting means obtained when the secondary beam and the primary beam having been reflected from said deflecting means are incident at the same time on said light detecting means in order to output a start of scan signal for each scan line at a moment when the primary beam and the secondary beam are incident at the same time on said light detecting means.

4,888,648

ELECTRONIC ALBUM

Ryozo Takeuchi; Yasuaki Suzuki; Tetsuya Nagata, and Eturo Hirose, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 2, 1987, Ser. No. 127,454
Claims priority, application Japan, Dec. 5, 1986, 61-288826
Int. Cl.[4] H04N *5/85*
U.S. Cl. 358—335 **11 Claims**



11. A method for storing image information in a non-volatile electronic file means of an electronic album system wherein said image information is obtained from various image recording mediums, said method comprising the steps:

reading, by file reader means, image information recorded on a recording medium by an electronic still camera;

receiving, by video input means, image information from video equipment;

selecting, by switch means, between said image information reading from said recorded medium as recorded by an electronic still camera and said image information received from said video equipment by said video input means;

adding, by editor means, index information to said selected image information;

manually inputting by an operator at least a fraction of said index information;

sequentially storing, in non-volatile electronic file means, said selected image information with said index information added thereto and retrieving said stored image information in accordance with said index information;

outputting, image output means, said selected image information add/or said retrieved image information; and

controlling said unit by control means.

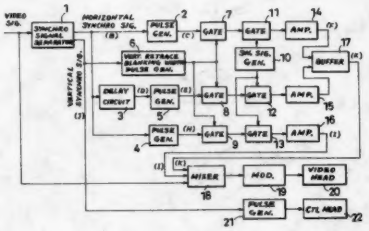
4,888,649

NONCOPIABLY RECORDED VIDEOTAPE AND NONCOPIABLY VIDEOTAPE-RECORDING SYSTEM

Minoru Kagota, Oume, Japan, assignor to Shinano Kikaku Company Ltd., Osaka, Japan

Filed Mar. 18, 1988, Ser. No. 169,622
Claims priority, application Japan, Mar. 18, 1987, 62-063080
Int. Cl.[4] H04N *5/782*
U.S. Cl. 358—335 **4 Claims**

1. A video tape on which a series of video signals to be reproduced as a series of visible images by a video signal reproducing apparatus is recorded together with disturbing signals for disturbing a video tape-recorder in copying said series of video signals so as to be normally reproduced by a video signal reproducing apparatus, each of said video signals being accompanied by a back porch and a horizontal synchronous signal, said series of video signals being divided into a plurality of subseries of video signals with vertical retrace-sweep blanking periods interposed and said horizontal synchronous signals



being contained also in said vertical retrace-sweep blanking periods, said disturbing signals comprising:

a series of first pulse signals inserted just after said horizontal synchronous signals in said vertical retrace-sweep blanking periods, said period corresponding to the time of said back porch;

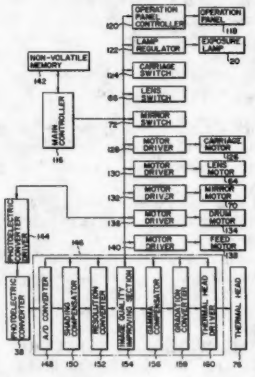
said series of first pulse signals and said series of second pulse signals being recorded alternatively.

4,888,650

IMAGE FORMING APPARATUS WITH FUNCTION OF AUTO ERROR CORRECTION FOR OPTICAL SYSTEM

Yasuo Abuyama, Ebina, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 16, 1988, Ser. No. 207,618
Claims priority, application Japan, Jun. 18, 1987, 62-150284
Int. Cl.[4] H04M *1/04*
U.S. Cl. 358—451 **7 Claims**



1. A scanning apparatus comprising:

means for supporting an original having an image;

means for applying light to the original supported by said supporting means;

means for converting the light from the original into an electric signal corresponding to the original image with a predetermined first magnification;

means for directing the light from the original to said converting means, said directing means having a fixed focal length and being movably disposed at a first position between said supporting means and said converting means;

means, located in a vicinity of said supporting means, for displaying a reference position where said directing means should be located;

means for detecting an error between the electric signal, corresponding to the light converted by said converting means and supplied through said directing means from said display means, and a pre-obtained electric signal corresponding to said display means;

means for setting a second magnification corresponding to the original image and supplied through said directing means from the original to said converting means; and

means for correcting the second magnification set by said setting means in accordance with the error detected by said detecting means and for moving said directing means to a second position corresponding to the corrected second magnification.

4,888,651

VIDEO SYSTEM

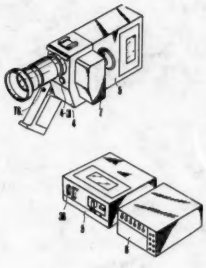
Masaya Maeda; Hiroyuki Takimoto, and Susumu Kozuki, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 153,463, Feb. 1, 1988, abandoned, and a continuation of Ser. No. 57,714, Jun. 1, 1987, abandoned, and a continuation of Ser. No. 729,682, May 2, 1985, abandoned, and a continuation of Ser. No. 351,605, Feb. 23, 1982, Pat. No. 4,531,164. This application Feb. 8, 1989, Ser. No. 308,127

Claims priority, application Japan, Feb. 26, 1981, 56-27140; Mar. 6, 1981, 56-32106; Mar. 6, 1981, 56-32107; Jun. 24, 1981, 56-97913

Int. Cl.[4] H04N *5/76*

U.S. Cl. 358—335 **7 Claims**



1. An information signal recording and reproducing system, comprising:

(A) a first apparatus including:

(a) a recording and reproducing head;

(b) a switch connected to said head and having a first state for making said head perform a recording and a second state for making said head perform a reproduction;

(c) a recording circuit which processes an information signal inputted therein and supplies the information signal as a recording signal to said head through said switch in the first state;

(d) moving means for relatively moving a recording medium and said head; and

(e) a first operating member which can instruct said head to start a recording by a manual operation, said first operating member being unable to instruct said head to start a reproduction;

(B) a second apparatus electrically and mechanically attachable to and detachable from said first apparatus, including:

(a) a reproducing circuit which has a signal reproduced at said head inputted therein through said switch in the second state and processes the reproduced signal and outputs it as a produced information signal; and

(b) a second operation member which can instruct said head to start said reproducing by a manual operation; and

(C) control means for controlling the system so that said first operating member cannot instruct said head to start a recording while said second apparatus is electrically and mechanically attached to said first appearance.

4,888,652

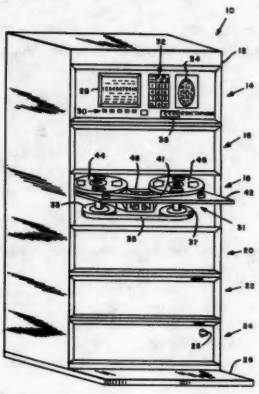
COMMUNICATIONS RECORDER HAVING A UNIQUE IDENTIFICATION CODE AND SECURE METHOD AND APPARATUS FOR CHANGING SAME

Willy M. Sander, Stamford, Conn., assignor to Dictaphone Corporation, Stratford, Conn.

Filed Sep. 17, 1987, Ser. No. 97,903

Int. Cl.[4] G11B *23/28*

U.S. Cl. 360—5 **15 Claims**



1. A system for monitoring signals received on at least one channel, comprising:

(a) recording means for recording said signals from each of said channels on changeable media;

(b) means for recording a unique system identification code on said media with said signals;

(c) means responsive to an entered password for changing said identification code, said changing means being responsive to a particular password once and only once.

4,888,653

HIGH SPEED VIDEO TAPE DUPLICATOR

Dennis Cullum, Leucadia, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 28, 1987, Ser. No. 138,277

Int. Cl.[4] G11B *5/86, 15/14*

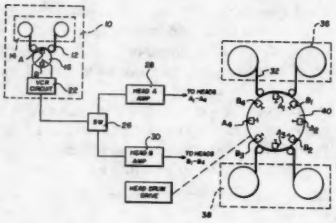
U.S. Cl. 360—15 **4 Claims**

1. Apparatus for high speed duplicating of video tape, comprising:

means for providing a high frequency video signa; and

record head means for simultaneously recording said high frequency video signal on a plurality of duplicate magnetic tapes at a record head speed which is N times the

head speed at which said recorded signal is normally played back such that the track length T of a field of video



signal recorded on said duplicate magnetic tapes is equal to the normal track length of a field of video signal.

4,888,654

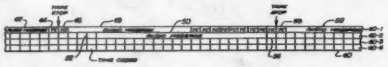
METHOD OF WRITING AND READING DIGITAL DATA INTERSPERSED WITH ANALOG AUDIO FREQUENCY DATA ON MAGNETIC RECORDING TAPE

Victor Blum, Tel Aviv, Israel, assignor to Odetics, Inc., Anaheim, Calif.

Division of Ser. No. 621,993, Jun. 18, 1984, Pat. No. 4,663,678. This application Nov. 28, 1986, Ser. No. 935,974

Int. Cl.[4] G11B *15/18, 15/02*

U.S. Cl. 360—74.1 **7 Claims**



4. A method of simultaneously recording a plurality of audio messages on a multitrack recording tape comprising the steps of:

initiating tape motion when a message is to be recorded;

recording a digital location indicating code on a first track of the tape followed by recording of the message;

repetitively recording digital location indicating codes on all remaining tracks of the tape;

halting the recording of digital codes and initiating the recording of audio messages on the remaining tracks as necessary;

continuing to record digital codes on any track which is not recording an audio message and resuming recording of digital codes on each track whenever the recording of an audio message on that track is completed, whereby every message recorded will be immediately preceded by a digital code; and

stopping tape motion when there is no audio message to be recorded on any track.

4,888,655

AIR FILTRATION SYSTEM FOR DISC DRIVES

Brian T. Bonn, Santa Cruz, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Jul. 18, 1988, Ser. No. 220,231

Int. Cl.[4] G11B *17/02*

U.S. Cl. 360—97.03 **6 Claims**

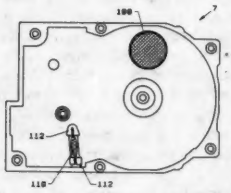
1. A disc drive comprising:

a housing including cast upper and lower casing members, the upper casing having a pair of filter support fingers extending internally of said housing;

a spindle motor assembly mounted to the lower casing member, the spindle motor assembly having a rotatable spindle hub;

a recording media including a plurality of vertically aligned magnetic information storage discs arranged as a disc pack and journaled about said spindle hub for rotation with the spindle hub during operation of the disc drive;

a breather filter mounted to the upper casing above the disc pack in a region of low pressure during operation of the



disc drive to maintain a pressure distribution above atmospheric pressure within the disc drive during operation; and

a recirculating filter disposed within the housing adjacent the disc pack, the recirculating filter being carried by said filter support fingers.

4,888,656

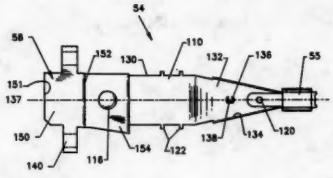
PIVOT MECHANISM FOR ROTARY DISC DRIVES

Terence H. West, Aptos, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Jul. 18, 1988, Ser. No. 220,232

Int. Cl.[4] G11B *5/55*

U.S. Cl. 360—106 **4 Claims**



1. A rotary actuator for a disc drive system having a head positioning assembly for positioning a plurality of transducer heads relative to a recording media located within a disc housing, the head positioner assembly including a pivot housing that carries the transducer heads, the rotary actuator comprising a pivot mechanism that includes:

a fixed pivot shaft that is supported by the drive housing on both ends;

a pair of spaced apart bearings each having outer races that are adhesively bonded to the pivot housing and inner races that are adhesively bonded to the pivot shaft;

preload means for pressing axially outwardly on the outer bearing races during adhesive bonding to the pivot housing to maintain a selected axial preload during adhesive bonding, the preload means including a spacer journaled about the pivot shaft between the spaced apart bearings and a non-coiled tension mechanism journaled about the pivot shaft adjacent the spacer for pressing against a first one of the bearings and pressing the spacer against the second bearing, the spacer having a diameter that is less than or equal to the diameter of the bearings and occupying at least 50 percent of the distance between the spaced apart bearings; and

wherein the pivot shaft and the pivot housing are both fabricated from the same material to minimize preloading variations during adhesive bonding of the outer races and

wherein the pivot shaft maintains a constant diameter between the bearings to maximize stiffness.

4,888,657

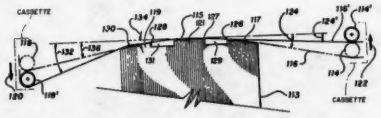
CONTOURED HEAD ASSEMBLY FOR USE IN A CASSETTE LOADED RECORDER

Christopher A. Lacey, Willimantic, Conn., and George W. Brock, La Jolla, Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 138,788, Dec. 28, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 274,540

Int. Cl.[4] G11B *5/22*

U.S. Cl. 360—122 **3 Claims**



1. In a recording system including a magnetic transducer assembly, the improvement comprising:

a, means for transporting a recording medium over said magnetic transducer assembly, said assembly having a magnetic transducing element located thereon,

b, means, external to said magnetic transducer assembly, for guiding said recording medium at nominal wrap angles relative to said magnetic transducing element,

c, said magnetic transducer assembly further comprising

an arcuate surface extending in the direction of said medium's motion, and

having two slots therein, said slots dividing said arcuate surface into a first outrigger, a central land for containing said magnetic transducing element at the apex thereon, and a second outrigger, wherein 1, the edges of said slots prevent entrainment of air between said medium and said magnetic transducing element, 2, said outriggers so position said medium as to maintain said nominal wrap angles substantially independent of variations in said means for guiding, and 3, said arcuate surface being so shaped that said recording medium continues to exert a constant pressure across said surface as said surface wears, whereby said surface maintains a constant area profile.

4,888,658

MAGNETIC HEAD FOR MAGNETIC RECORDING AND REPRODUCING UNIT

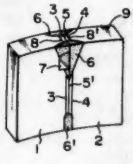
Mitsuaki Ono, Katano; Masataka Ueda, Okayama, and Osamu Miyazaki, Kodama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 856,341, Apr. 28, 1986, abandoned. This application Apr. 1, 1988, Ser. No. 175,605

Claims priority, application Japan, Apr. 30, 1985, 60-93014; May 20, 1985, 60-1074372; Jul. 4, 1985, 60-147564; Feb. 27, 1986, 61-42239

Int. Cl.[4] G11B *5/31, 5/187, 5/23*

U.S. Cl. 360—126 **3 Claims**



1. A magnetic head comprising:

a head gap formed of a non-magnetic material extending transversely across a widthwise dimension and along a depthwise dimension of said magnetic head, said head gap including a transducing gap disposed near a tape contacting surface of said magnetic head and a rear gap disposed behind said transducing gap,

a magnetic core comprising (i) high permeability ferrite members, and (ii) magnetic alloy members of a high saturation magnetic flux density integrated with said ferrite members, said magnetic alloy members being disposed on opposite sides of said transducing gap, each of said magnetic alloy members having an edge disposed at one side of said transducing gap, each of said magnetic alloy members being disposed to extend in said depthwise dimension of said magnetic head and defining a portion of said tape contacting surface of said magnetic head, said ferrite members being disposed adjacent to other sides of said magnetic alloy members to define function portions disposed at opposite sides of said transducing gap and said rear gap between said ferrite members and said magnetic alloy members, said junction portions extending in said depthwise dimension of said magnetic head to be oriented substantially vertically relative to said tape contacting surface,

a first notched groove and a second notched groove each filled with non-magnetic material and formed in an edge of said ferrite members and said magnetic alloy members and disposed on opposite ends of said transducing gap, said first notched groove and said second notched groove each having a straight portion extending from an end of said head gap at least to one of said junction portions, said straight portion of said first notched groove and said straight portion of said second notched groove being substantially parallel to each other, and

said junction portions having a corrugated shape with crests having a predetermined angle and trough portions having a curved planar shape, a height of each junction portion between its crests and its trough portion being greater than or equal to a magnitude of a longest wavelength of luminescence signals and color signals recorded on a magnetic recording medium, a distance between adjacent crests and adjacent troughs of said junction portions being less than a track width of said head, wherein said crests of said junction portions are disposed in non-symmetrical relationship to each other relative to said head gap.

4,888,659

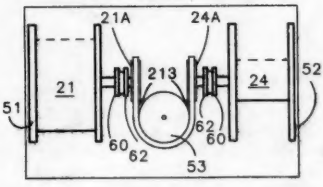
TAPE CARTRIDGE FOR USE IN DISC DRIVE

Robert O. Marquez, Greeley, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 3,998, Jan. 16, 1987, abandoned. This application Oct. 6, 1988, Ser. No. 256,061

Int. Cl.[4] G11B *23/02*

U.S. Cl. 360—132 **45 Claims**



1. A tape cartridge for transferring data between a length of tape and a disc drive head in a disc drive, said tape cartridge comprising:

(a) a length of tape suitable for recording data thereon and for transferring data between the tape and said disc drive head; wherein said tape includes first and second ends;

(b) a first rotatable reel on which said tape may be wound; said first end of said tape being secured to said first reel;
(c) a second rotatable reel on which said tape may be would; said second end of said tape being secured to said second reel;
(d) registration means adapted to register a portion of said tape with a predetermined location at which data can be transferred between said tape and disc head;
(e) feeding means adapted for feeding said tape past said predetermined location;
(f) a first continuously acting clutch means operably connected to said first reel for driving said first reel; and
(g) a second continuously acting clutch means operably connected to said second reel for driving said second reel; wherein said feeding means is selectively rotatable in opposite directions and is coupled to said first and second clutch means; and

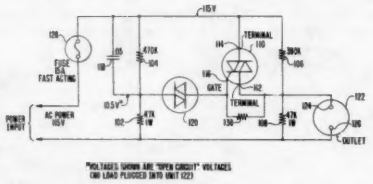
wherein when one said clutch means is driven in one direction it is adapted to rotate the reel to which it is connected such that said tape is wound onto said reel while the other said clutch is adapted to permit the reel to which it is connected to be rotated so as to unwind tape therefrom.

4,888,660

SHOCK-PROOF MAINS VOLTAGE SUPPLY OUTLET AND METHOD

E. H. B. Bartelink, Concord, N.H., assignor to Academy of Applied Science, Concord, N.H.

Filed Jun. 17, 1988, Ser. No. 208,268
Int. Cl.[4] H02H *3/16*
U.S. Cl. 361—49 **10 Claims**



1. A method of rendering an outlet having terminals connected to a mains power supply of predetermined supply voltage safe from shock upon human touching of the outlet terminals, that comprises, sensing whatever impedance may be presented between said terminals; responding to said sensing to apply only a fraction of said predetermined supply voltage from said supply for sensed impedance values corresponding to the relatively high impedance presented by the human body, wet or dry, or by animals; and responding to said sensing to apply substantially full predetermined supply voltage for sensed impedance values corresponding to the relatively low impedance presented by appliances.

4,888,661

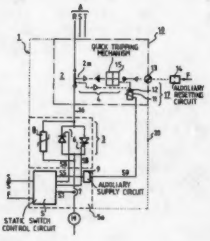
CIRCUIT AND APPARATUS FOR THE PROTECTED SUPPLY OF A LOAD BY MEANS OF STATIC AND ELECTROMECHANICAL SWITCHES

Elie Belbel, Epinay Sur Seine; Thierry Boucheron, Saint Germain En Laye; Michel Lauraire, Courbevoie, and Jean-Paul Riotte, Epinay Sur Seine, all of France, assignors to La Telemecanique Electrique, France

Filed Jul. 18, 1988, Ser. No. 220,647
Claims priority, application France, Jul. 17, 1987, 87.10112
Int. Cl.[4] H02H *3/00*
U.S. Cl. 361—102 **8 Claims**

1. An apparatus for supplying a load from an AC-power source through a serial circuit comprising the serial connection of electromechanical switch means having electromechanical control means and static switch means having control electrodes, said apparatus further comprising means for measuring the current flowing through the serial circuit and generating at each occurence of a current overload disabling signals respectively applied to said electromechanical control means and to said control electrodes, wherein:

said electromechanical switch means has current limiting properties;



said static switch means includes at least one low voltage controlled semi-conductor component of the IGBT type and a voltage limiting component connected in parallel across said semi-conductor component;

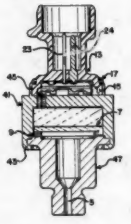
the time delay elapsed between an occurence of a current overload and the opening of said electromechanical switch means is substantially shorter than the duration of a half-wave of the overload current.

4,888,662

HIGH PRESSURE PACKAGE FOR PRESSURE TRANSDUCERS

Robert P. Bishop, Carver, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 8, 1988, Ser. No. 282,185
Int. Cl.[4] H01G *7/00*; G01L *9/12*
U.S. Cl. 361—283 **25 Claims**



1. A pressure transducer which comprises, in combination:
(a) housing means having a high pressure fluid inlet;
(b) a pressure sensing element communicating with said fluid inlet and disposed within said housing means;
(c) a rigid support member abutting said pressure sensing element, said support member having a pair of opposed surfaces and secured within said housing and capable of sustaining the pressures to be encountered at the pressure inlet portion thereof, supporting said pressure sensing element on one of said opposed surfaces; and
(d) an electrical connector secured to at least one of the other opposed surface of said support member and said housing means and isolated from said pressure sensing element by said support member.

4,888,663

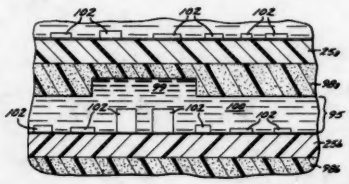
COOLING SYSTEM FOR ELECTRONIC ASSEMBLY

Ernest P. Longerich, Chatsworth, and Saverio A. D'Agostino, Camarillo, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 843,965, Mar. 25, 1986. This application Jun. 18, 1987, Ser. No. 63,377

Int. Cl.[4] H01L *23/44*

U.S. Cl. 361—385 3 Claims



1. A cooled electronics unit comprising:

a plurality of electrically interconnected circuit cards populated with electrical components;

an enclosure enclosing and supporting said plurality of circuit cards and forming a sealed unit;

an electrically non-conductive coolant liquid disposed within said sealed unit in direct contact with areas of said circuit cards and said components so as to absorb heat generated by said components;

said circuit cards supported in spaced apart relationship defining spaces between adjacent circuit cards;

said liquid disposed within said spaces; and

a layer of closed cell from attached to an unpopulated region of at least one such card and located within one such space whereby the thickness of said layer in a particular local area may be adjusted to control the volume of liquid in said local area such that its cooling capacity can accomodate the cooling requirements of the electrical components in the same local area on an adjacent circuit card.

4,888,664

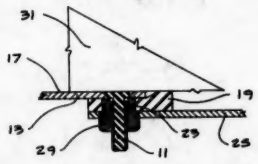
COOLING AIRFLOW COUPLING APPARATUS FOR AVIONIC TRAYS

Karl J. Rojc, Englewood, Colo., assignor to Aspen Industries, Inc., Englewood, Colo.

Filed Jul. 5, 1988, Ser. No. 215,387

Int. Cl.[4] H05K *7/20*

U.S. Cl. 361—383 6 Claims



1. A cooling airflow coupling apparatus for avionic trays the combination which comprises:

a one piece, jointless gasket;

a tray having an entirely flat bottom surface with an airflow orifice;

a detachable metering plate, said metering plate containing a plurality of metering ports;

means aligning and securing said one piece, jointless gasket to said tray and said metering plate;

means compressing said one piece, jointless gasket between said tray and said metering plate in such a manner that said one piece, jointless gasket protrudes through the airflow orifice of said tray, said protruding portion of said gasket provides an airtight seal between an electronic unit and said tray when said electronic unit is mounted on said tray;

whereby said apparatus provides a highly reliable readily interchangeable, and cost effective cooling airflow coupling for avionic trays;

further including a compression stop means to limit gasket compression.

4,888,665

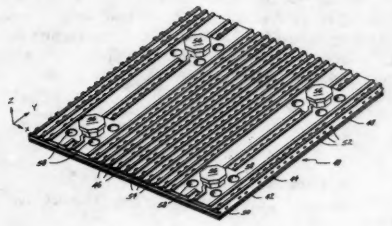
CUSTOMIZABLE CIRCUITRY

Lawrence N. Smith, Austin, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Feb. 19, 1988, Ser. No. 158,172

Int. Cl.[4] H05K *1/02*

U.S. Cl. 361—400 19 Claims



1. An interconnect for connecting electrical components, comprising:

at least one conductive plane;

a first set of essentially parallel electrically conductive wires forming a regular structure which is repeated stepwise across said interconnect;

a first insulation layer separating said at least one conductive plane and said first set of wires;

a second set of essentially parallel electrically conductive wires forming a regular structure which is repeated stepwise across said interconnect, said second set of wires being non-planar and non-parallel to and forming areas of wire overlap with said first set of wires;

a second insulation layer separating said first set of wires and said second set of wires;

means for connecting overlapping wires at said areas overlap;

means, positioned about said interconnect, for bonding said interconnect to an attached electrical component, respective subsets of said said first and second sets of wires being between adjacent bonding means; and

access areas, in proximity to said bonding means, extending through said interconnect to said at least one conducive plane, to allow selective electrical connection between said bonding means and said at least one conductive plane.

4,888,666

ROLL TYPE SOLID ELECTROLYTIC CAPACITOR

Kazumi Naitoh, and Yoshiaki Arakawa, both of Yokohama, Japan, assignors to Showa Denko Kabushiki Kaisha and Nippon Chemi-Con Corporation, both of Tokyo, Japan

Filed May 20, 1987, Ser. No. 51,787

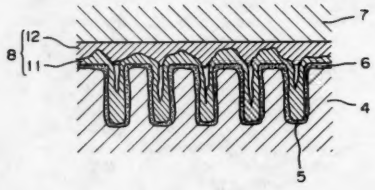
Claims priority, application Japan, May 20, 1986, 61-113521; May 20, 1986, 61-113538; May 21, 1986, 61-114935; May 22, 1986, 61-116087; Jul. 16, 1986, 61-167146; Jul. 21, 1986, 61-171059; Dec. 27, 1986, 61-313405; Dec. 27, 1986, 61-310686; Dec. 27, 1986, 61-310688

Int. Cl.[4] H01G *9/02*

U.S. Cl. 361—512 9 Claims

1. A roll type solid electrolytic capacitor comprising a ca-

pacitor element in the form of a roll which consists of a valve metal positive electrode substrate having a dielectric oxide layer on both of the entire surfaces thereof, a semiconductor layer formed on the entire surface of each dielectric oxide



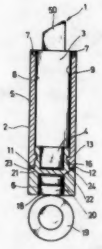
layer and an electroconductive layer formed on the entire surface of each semiconductor layer, said electroconductive layer being formed from at least one electroconductive paste selected from the group consisting of a silver paste, a copper paste, a nickel paste, an aluminum paste and a carbon paste.

4,888,667

LIPSTICK CAP WITH LAMP DEVICES

Kuo H. Hwang, 115, Kuo Tze Lih, Pei Twen District, Taichung, Taiwan

Filed Apr. 14, 1989, Ser. No. 338,728
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—109 **4 Claims**



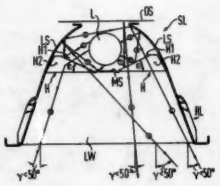
1. A lipstick cap with lamp devices, comprising a cap sleeve used to receive common lipstick seat, having an upper end and a lower end, wherein said upper end is provided with several lamp devices, and said lower end is equipped with two separate conducting semirings, a pair of opposite conducting plates being mounted on said lipstick cap between said upper end and lower end to electrically connect said lamp devices to said semirings in series; and a rotary switch having an upper small diameter portion and a lower large diameter portion, forming a step portion there between, wherein said upper portion is rotarily received in said lower end of the cap sleeve, and said step portion has a pair of joint points capable of respectively selectively electrically connecting with said two semirings when turning said rotary switch, and said lower portion has a battery container covered by a cover, having an anode conducting plate and a cathode conducting plate penetrating through said battery container and respectively electrically connecting with said joint points whereby when batteries are mounted in said battery container, a circuit is formed and controlled by means of turning said rotary switch to connect said joint points to said semirings or disconnect the joint points from said semirings, and consequently, the lamps can be lighted up or shut off according to illuminating requirement.

4,888,668

MIRROR LIGHT UNIT

Karl-Fritz Roll, Chieming, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 14, 1988, Ser. No. 244,163
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1987, 3732610
Int. Cl.[4] F21V *7/00*
U.S. Cl. 362—291 **6 Claims**



1. A mirror lighting unit for a rod-shaped lamp, especially a fluorescent tube, having longitudinal mirrors extending on both sides parallel to the lamp, and louvre vanes arranged transverse thereto underneath the lamp and adjusted relative to the lamp with a base of their double-parabola-shaped cross-section, wherein all along their length the louvre vanes have a hood-shaped cover with reflecting surfaces on the base side of their cross-section, and with this line of intersection of the cover with a plane extending perpendicular to the longitudinal axis of the lamp has a concave curvature symmetrical in relation to the longitudinal axis of the lamp, comprising for simple manufacture of the louvre vanes, including their hood-shaped cover, from in each case one shapeable sheet-metal part the concave curvature of the line of intersection of the hood-shaped cover being approximated with a flat central part, which merges on both sides into a four-sided pyramid-shaped hood open towards the adjacent longitudinal mirror, and an angle of pitch ϵ

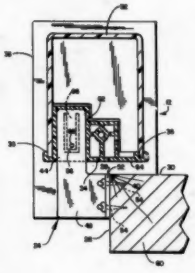
sides of the pyramid-shaped hoods, which continue (ϵ) of upper sides of the pyramid-shaped hoods, which continue the flat central part on opposite sides, being dimensioned so as to approximate the resultant course of the line of intersection to a parabola.

4,888,669

EXTERIOR LIGHTING SYSTEM

Mark L. Hanson, Long Lake, Minn., assignor to MinnFac, Inc., Minneapolis, Minn.

Filed Oct. 6, 1988, Ser. No. 254,211
Int. Cl.[4] F21V *21/00*
U.S. Cl. 362—145 **9 Claims**



1. A lamp fixture comprising:

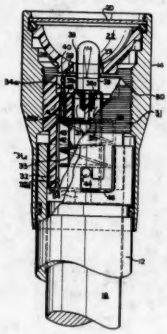
an illumination source;
a translucent, elongated housing;
a backplane to the elongated housing for supporting the illumination source within the housing;
first and second opaque endpieces for closing the opposite ends of the housing, each endpiece have a back edge substantially parallel to the backplane, each back edge having a right angled indentation at one corner thereof for flush mating of the end piece around an edge of a deck, wall, rail, riser, or similar portion of an outdoor structure; and
means for mounting the lamp fixture substantially flush with respect to the edge of a deck, wall or similar portion of an outdoor structure.

4,888,670

MICRO-FLASHLIGHT

Raymond L. Sharrah, Collegeville, Pa., assignor to Streamlight, Inc., Norristown, Pa.

Continuation of Ser. No. 97,200, Sep. 16, 1987, Pat. No. 4,777,582. This application Mar. 9, 1988, Ser. No. 166,096
Int. Cl.[4] F21L *7/00*
U.S. Cl. 362—205 **6 Claims**



1. A flashlight comprising:
a barrel for holding a power cell, said barrel being formed with a single open end;
a socket assembly for holding a light bulb, said socket assembly including socket retaining means for retaining said socket assembly in the open end of said barrel so as to retain the power cell in said barrel and such that said socket assembly can be removed to install or replace the power cell; and
a head unit formed to engage with said socket assembly, said head unit including a substantially parabolic reflector having a central opening to permit the light bulb to pass therethrough, said head unit further including head retaining means for maintaining said head unit in engagement with said socket assembly.

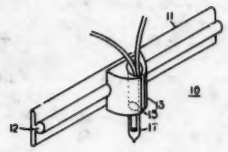
4,888,671

ORNAMENTAL STRIP LIGHT MOUNTING MEANS

Peter Reimer, P.O. Box 571, Shafter, Calif. 93263

Continuation-in-part of Ser. No. 167,781, Mar. 14, 1988, abandoned. This application Dec. 27, 1988, Ser. No. 290,801
Int. Cl.[4] F21Y *21/34*
U.S. Cl. 362—250 **9 Claims**

1. An ornamental light string mounting means which comprises:
an elongated base strip of flexible and resilient material having a longitudinal rib means formed integrally therewith for attachment to a structure;
a plurality of light socket holders having first receiving channels longitudinally disposed therein, for receiving a light socket;
said socket holders having a second receiving channel transversely disposed therein for receiving and frictional attachment with the longitudinal rib means of the elongated base strip, whereby each of said light socket holders may be independently and adjustably held in a fixed position along the elongated base strip.

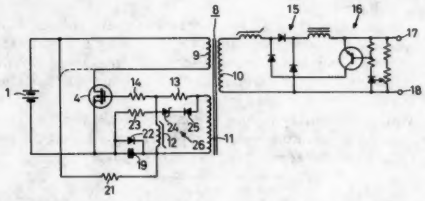


4,888,672

STARTING CIRCUIT OF SELF-EXCITED INVERTER

Rihei Hiramatsu, Tokyo; Seiji Imano, Inagi; Kazushi Watanabe, Nagaoka, and Shinzo Takeishi, Kawasaki, all of Japan, assignors to Nemic Lambda Co., Ltd.; Densetsu Co., Ltd and Yutaka Electric Mfg. Co., Ltd., all of, Japan

Filed Nov. 18, 1988, Ser. No. 288,793
Claims priority, application Japan, Aug. 31, 1988, 63-217385
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—49 **3 Claims**



1. A starting circuit of a self-excited inverter comprising a main transformer having a primary input winding, secondary output winding and tertiary self-excited oscillation winding, wherein said primary input winding and a switching element are serially connected to a power source; said switching element is driven by said tertiary self-excited oscillation winding through an appropriate serially connected impedance and a parallelly connected saturation reactor; said switching element consists of a MOSFET; a capacitor is inserted between said MOSFET and said saturation reactor; and a resistor is interposed between the coupling point of said saturation reactor and the capacitor and said power source.

4,888,673

HIGH VOLTAGE DC POWER SUPPLY

Thomas F. Droege, Batavia, Ill., assignor to Universities Research Association Inc., Batavia, Ill.

Filed Mar. 30, 1988, Ser. No. 175,097
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—21 **7 Claims**

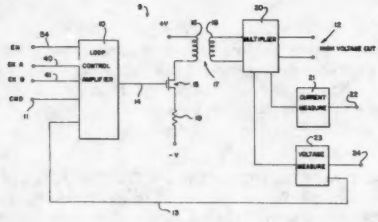
1. A DC power supply having a high voltage output comprising:
loop control amplifier means for developing a pulse width controlled signal in response to a magnitude difference between a command voltage and a feedback voltage derived from said high voltage output;
driver means for controlling current through a primary coil of a step-up transformer, said driver means responsive to said pulse width controlled signal;

multiplier means for rectifying and increasing voltage present at a secondary coil of said step-up transformer;

voltage divider means coupled to said multiplier means for sensing the voltage produced by said multiplier means and for providing said feedback voltage;

current limiting resistor means in series with said high voltage output for protecting components of said power supply from damage in the event of a short circuit of said high voltage output;

current sensing resistor means in series with said high voltage output for developing a voltage representing current magnitude flowing through said high voltage output, said current sensing resistor means coupled to said voltage



divider means so that said voltage representing current magnitude modifies said feedback voltage to compensate for a voltage drop across said current limiting resistor means so as to maintain voltage regulation of said high voltage output;

current measuring means responsive to said voltage representing current magnitude for providing a signal representing current magnitude for providing a signal representing current magnitude flowing through said high voltage output; and

voltage measuring means responsive to said feedback voltage for providing a signal representing a voltage magnitude present at said high voltage output.

4,888,674

METHOD AND APPARATUS FOR DECOUPLING THE ACTIVE AND REACTIVE POWER CONTROL FOR A HIGH VOLTAGE DC TRANSMISSION LINE COUPLING TWO NETWORKS

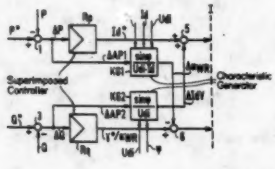
Manfred Weibelzahl, Uttenreuth-Weiher, and Georg Wild, Langensendelbach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 21, 1988, Ser. No. 288,282

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743997

Int. Cl.[4] H02J *3/36*

U.S. Cl. 363—35 **10 Claims**



1. A method for controlling the active and reactive power transmission between two electrical networks which are coupled via a high-voltage d-c transmission line (HVDC line) where each said network is coupled via a controlled converter to the HVDC line, with one of the converters being operated as a rectifier and the other converter as an inverter, the control angle control variable for the control unit of the converter operated as a rectifier being given by a subordinated current controller, for control of d-c current in the HVDC line, a reference value for said current controller being given by a superimposed power controller for active power in one of said networks, the control angle control variable for the control unit of the converter operated as an inverter being derived from the output of a superimposed controller for at least one of the voltage and the reactive power in one of said networks, the method comprising the steps of:

adding a first pilot control variable with a negative sign to the output signal of the superimposed voltage/reactive power controller, said first pilot control variable depending, at a respective operating point, on the rate of change of the control angle for the converter operated as an inverter to the change of the active power and on the actual active power control deviation; and

adding a second pilot control variable to the output signal of the superimposed active power controller, said second pilot control variable depending, at a respective operating point, on the rate of change of the actual d-c current value, and on a change of at least one of the voltage and reactive power, and on the actual voltage or reactive power control deviation.

4,888,675

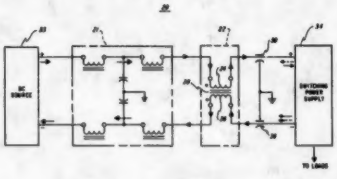
SWITCHING POWER SUPPLY FILTER

Prithvi R. Kumar, Melbourne, and Wayne Abare, West Melbourne, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 26, 1987, Ser. No. 89,469

Int. Cl.[4] H02M *1/14*

U.S. Cl. 363—47 **4 Claims**



1. A switching power supply being adapted for connection to a dc voltage source for providing an ac voltage to a load, comprising:

an inverter for producing the ac voltage, wherein said inverter includes first and second input terminals;

a common-mode inductor including a first coil having a first terminal connected to a first output terminal of the dc voltage source and a second coil having a first terminal connected to a second output terminal of the dc voltage source;

a first feed-through capacitor having a first terminal connected to a second terminal of said first coil, a second terminal connected to the first input terminal of said inverter, and a third terminal connected to ground;

a second feed-through capacitor having a first terminal connected to a second terminal of said second coil, a second terminal connected to the second input terminal of said inverter, and a third terminal connected to ground;

wherein the dc voltage source provides dc current to said inverter, and wherein said inverter produces common-mode noise that propagates back toward the dc voltage source, and wherein said common-mode inductor presents a high impedance to the common-mode noise, and wherein said first and said second feed-through capacitors present a low impedance to the common-mode noise such that in combination with said common-mode inductor the common-mode noise is shunted to ground through said

feed-through capacitors while permitting the dc current to pass therethrough.

4,888,676

DAMPING CIRCUIT FOR TURN-OFF VALVES

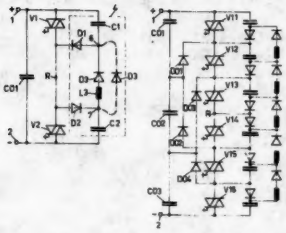
Urs Zärcher, Turgi, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Filed Dec. 6, 1988, Ser. No. 280,641

Claims priority, application Switzerland, Dec. 7, 1987, 4779/87

Int. Cl.[4] H02M 1/06

U.S. Cl. 363—58 7 Claims



1. Damping circuit for at least two series-connected turn-off valves

(a) a series circuit composed of a turn-off load-shedding capacitor and a turn-off load-shedding diode pole in the same direction as the turn-off valve being provided parallel to each turn-off valve, and

(b) the common junction points of turn-off load-shedding capacitors and turn-off load-shedding diodes of respectively two series-connected turn-off valve being conductively interconnected in a unidirectional fashion via at least one capacitor load-shedding diode, wherein,

(c) the turn-off valves are directly connected in series.

4,888,677

THREE RESERVOIR CAPACITOR

Michael A. Grimm, Boulder Creek, and Paul Hildebrant, San Jose, both of Calif., assignors to Teledyne Industries, Inc., Mountain View, Calif.

Filed Jan. 27, 1989, Ser. No. 302,429

Int. Cl.[4] H02M 7/25

U.S. Cl. 363—60 4 Claims

1. A charge pump circuit operating from an input rail provided at a first potential difference relative to a reference potential rail to provide second and third potential differences also relative to said reference potential rail on first and second output rails, said charge pump circuit comprising:

(a) first, second and third capacitors;

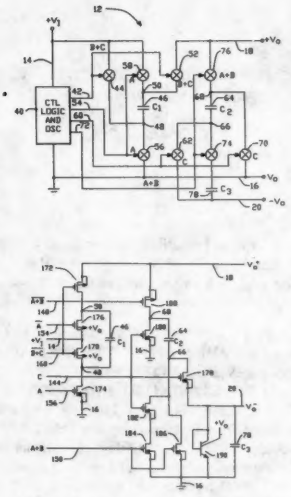
(b) oscillator means for providing a timing control signal; and

(c) control means, responsive to said timing control signal, for coupling said first, second and third capacitors in a plurality of configurations including:

(i) a first configuration wherein said first capacitor is coupled between said input rail and said reference potential rail, said second capacitor is coupled between said first output rail and said reference potential rail, and said third capacitor is coupled between said reference potential rail and said second output rail;

(ii) a second configuration wherein said first capacitor is coupled between said first output rail and said input rail, said second capacitor is coupled between said first output rail and said reference potential rail, and said third capacitor is coupled between said reference potential rail and said second output rail; and

(iii) a third configuration wherein said first capacitor is coupled between said first output rail and said input rail,



said second capacitor is coupled between said reference potential rail and said second output rail, and said third capacitor is coupled between said reference potential rail and said second output rail;

said control means providing for the decoupling of said first capacitor from between said input rail and said reference potential rail prior to enabling said second configuration and from between said second output rail and said input rail prior to enabling said first configuration and for the decoupling of said second capacitor from between said first output rail and said reference potential rail prior to enabling said third configuration and from between said reference potential rail and said second output rail prior to enabling said first configuration.

4,888,678

ELECTRIC SOCKET ADAPTER

Shaam P. Sundhar, 87 Juniper Ave., Westerville, Ohio 43081

Filed Sep. 30, 1988, Ser. No. 251,440

Int. Cl.[4] H02M 1/00

U.S. Cl. 363—146 20 Claims

1. A socket adaptor for use with light bulbs comprising

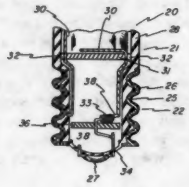
a first end capable of placement into a bulb socket designed for use with a light bulb,

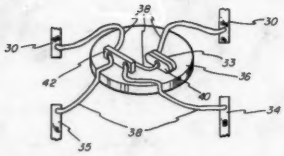
a second end capable of retaining a light bulb therein,

a housing connecting said first and second ends, and

a rectifier electrically connected to both said first and second

ends that reduces the effective voltage that will pass through said socket adaptor from said bulb socket to said light bulb, said rectifier electrically connected directly to





a thermistor, said rectifier electrically connected to a bridge rectifier, said bridge rectifier reducing the RMS value associated with said socket adaptor.

4,888,679

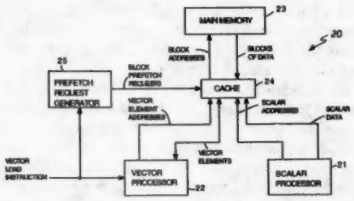
METHOD AND APPARATUS USING A CACHE AND MAIN MEMORY FOR BOTH VECTOR PROCESSING AND SCALAR PROCESSING BY PREFETCHING CACHE BLOCKS INCLUDING VECTOR DATA ELEMENTS

Tryggve Fossum; Ricky C. Hetherington; David B. Fite, Jr., all of Northboro; Dwight P. Manley, Holliston; Francis X. McKeen, Westboro, and John E. Murray, Acton, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jan. 11, 1988, Ser. No. 142,794

Int. Cl.[4] G06F *9/38, 15/347*

U.S. Cl. 364—200 **31 Claims**



1. A method of operating a digital computer, said digital computer including a vector processor, a main memory, and a cache; said main memory including means for storing data elements at respective addresses; said cache including cache memory means for storing selected predefined blocks of said data elements, means for receiving requests to reference a specified block of said data, means for checking whether data for the specified block is stored in the cache memory means, and means operative when data for the specified block is not so stored for reading the specified block of data from said main memory and storing the block of data in the cache memory means; said method comprising the steps of:

receiving an instruction to obtain a specified vector of said data elements and load said vector into said vector processor,

determining the blocks of data which include at least one data element of said vector, and

transmitting requests to reference the blocks of data which are determined to include at least one data element of said vector.

4,888,680

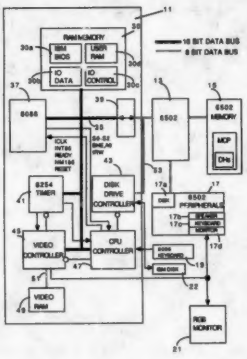
PERIPHERAL DEVICE INTERFACE AND CONTROLLER

Wendell Sander, Los Gatos; Dick Huston, Boulder Creek; Walter Broedner, and Clifford Huston, both of Saratoga, all of Calif., assignors to Little Blue Limited Partnership, Campbell, Calif.

Filed Oct. 14, 1987, Ser. No. 108,064

Int. Cl.[4] G06F *15/16, 13/10*

U.S. Cl. 364—200 **3 Claims**



1. An interfacing apparatus coupling first and second microprocessors which operate under first and second operating systems respectively to enable peripheral devices to be used for input/output operations in conjunction with the first microprocessor operating under the first operating system, to be used for input/output operations in conjunction with the second microprocessor operating under the second operating system, said first and second microprocessors having independent address buses, and data buses, said apparatus including said second microprocessor, a memory, a bus coupling said memory to and to a controller means, said controller means for controlling the input/output operations of said first and second microprocessors, said controller means comprising:

control and instruction decode logic means coupled to said second microprocessor for decoding microinstructions generated by said second microprocessor and generating signals which allow the first microprocessor to control the second microprocessor;

register means coupled to said memory and said control and instruction decode means, said register means for latching data on said buse for use by said control and instructions decode logic means;

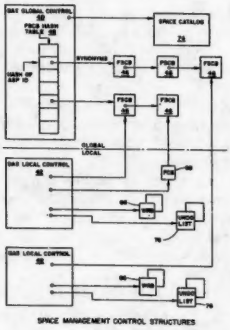
state machine means coupled to said register means, said control and instruction decode logic means and said second microprocessor for arbitrating the input/output accesses by the second microprocessor to be performed by the first processor using peripheral devices of said first microprocessor.

4,888,681

SPACE MANAGEMENT SYSTEM FOR DATA FILES HAVING SHARED ACCESS

Cherie C. Barnes, Barton; Robert B. Bennett, Endwell, and Thomas J. Szczygielski, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 19, 1987, Ser. No. 110,463
Int. Cl.[4] G06F *1/00*
U.S. Cl. 364—200 **20 Claims**



1. A method of managing file space in a data access system which provides shared file access to a plurality of application support processors, comprising the steps of:

keeping in a space catalog the various file space parameters associated with each logical file space assigned to a particular application support processor;

creating a file space control block that information which relates to said logical file space in order to help coordinate changes which affect the amount of file space needed;

building work request blocks o keep track of changes in file space consumption caused by work unit routines generated by one of the application support processors;

in the event of a successfui completion of a work unit routine, performing a commit operation by transferring the changes in file space consumption from the work request blocks to the space catalog as well as to the appropriate file space control block.

4,888,682

PARALLEL VECTOR PROCESSOR USING MULTIPLE DEDICATED PROCESSORS AND VECTOR REGISTERS DIVIDED INTO SMALLER REGISTERS

Chuck H. Ngai; Edward R. Wassel, both of Endwell, and Gerald J. Watkins, Endicott, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 903,934, Sep. 5, 1986, abandoned, which is a continuation of Ser. No. 538,318, Oct. 3, 1983, abandoned, which is a continuation-in-part of Ser. No. 530,842, Sep. 9, 1983. This application Mar. 20, 1989, Ser. No. 327,405
Int. Cl.[4] G06F *9/18*
U.S. Cl. 364—200 **9 Claims**

1. A vector processor, comprising:

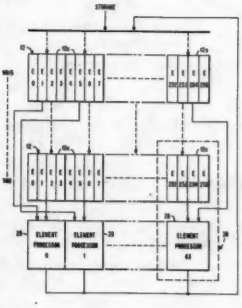
a plurality of vector register means, each of said vector register means storing a vector, each of said vector register means being divided into a plurality of smaller register means, each of said smaller register means storing a plurality of elements of one of said vectors, said plurality of smaller register means having a plurality of outputs;

a plurality of element processor means connected, respectively, to the plurality of outputs of said plurality of smaller register means, each of said element processor means being dedicated and connected to a different set of said smaller resisters to process any element within the dedicated set, each of said sets comprising one smaller register per vector register and wherein all the smaller registers in each set store corresponding vector elements of said vectors, each said element processor means processing said plurality of elements stored in the dedicated smallcr register means thereby producing a result, said result being stored in said element processor means,

each said element processor means and its plurality of corresponding smaller register means being a unit, the plurality of element processor means and the corresponding plurality of smaller register means forming a plurality of said units,

said plurality of said units including a first group of said units and a second group of said units, a plurality of outputs corresponding to the units of said first group being connected, respectively, to a plurality of inputs corresponding to the units of said second group; instruction storage means for storing instructions including an instruction routine; and

instruction processor means connected to said instruction storage means and to an output of at least one unit of said



second group for receiving said instruction routine from said instruction storage means, executing said instruction routine, and generating output signals;

a plurality of the results stored in the units of said first group being processed, respectively, with a plurality of the results stored in the units of said second group in response to said output signals from said instruction processor means thereby producing a corresponding plurality of processed results, the processed results being stored in the respective units of said second group,

the units of said second group including a first unit and remaining units, the processed results stored in said remaining units being processed, in parallel fashion, with the processed result stored in said first unit in response to said output signals from said instruction processor means thereby producing one result, said one result being stored in said first unit of said second group;

whereby said one result may be used by said instruction processor means during the execution of one of said instructions.

4,888,683

METHOD AND APPARATUS FOR LOADING PROGRAMS IN A DISTRIBUTED PROCESSING SYSTEM

Minoru Koizumi; Kinji Mori, both of Yokohama; Yasuo Suzuki, Ebina; Katsumi Kawano, Fuchu; Masayuki Orimo, Kawasaki; Hirokazu Kasashima, Hitachi, and Kozo Nakai, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

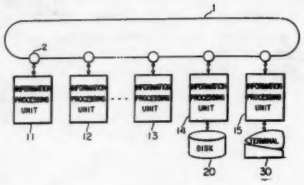
Continuation of Ser. No. 929,914, Nov. 13, 1986, Pat. No. 4,785,397. This application Oct. 11, 1988, Ser. No. 255,251

Claims priority, application Japan, Nov. 15, 1985, 60-254759

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[4] G06F *1/00*

U.S. Cl. 364—200 **5 Claims**



1. A method for loading a program in a distributed processing system including a plurality of information processing units interconnected by a transmission system, comprising the steps of:

storing at least one program and its identifier in a memory of at least one of said information processing units;

retrieving from said memory at least one stored program based on information relating to a program to be loaded;

transmitting said at least one stored program retrieved from said memory and its identifier; and

receiving a receiving program based on said identifier of said at least one stored program being transmitted and loading the received program in a memory in at least one information processing unit other than said information processing unit transmitting said stored program and its identifier.

4,888,684

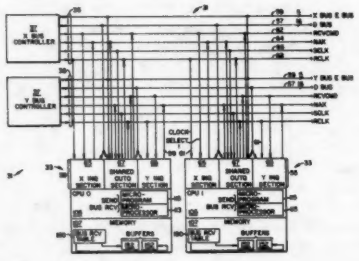
MULTIPROCESSOR BUS PROTOCOL

David J. Lilja, Sunnyvale; A. Richard Zacher, Los Gatos, and Steven W. Wierenga, Sunnyvale, all of Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.

Filed Mar. 28, 1986, Ser. No. 845,906

Int. Cl.[4] G06F *13/00, 13/12, 13/14, 13/22*

U.S. Cl. 364—200 **14 Claims**



1. In a multiprocessor computer which includes a bus and two or more processors coupled to said bus, where first and second processors may exchange a packet of data words during a packet transfer cycle, a bus protocol system for controlling access to the bus by the processors and for establishing a sender/receiver processor pair comprising:

means for conducting a first poll of said processors to determine which processors are ready to send a packet over said bus said polling means including means for generating said first poll independent of whether any of the processors are ready to exchange packets of data words;

means for indicating that a selected processor is either ready or not ready to send in response to said first poll;

means for sequentially selecting a given one of said processors indicated as ready in response to said first poll as a send processor, granting said selected processor access to the bus for a complete data transfer cycle to allow said selected processor to send its packet, and selecting another one of said processors indicated as ready in response to said first poll to be send processors in an open loop fashion until all said ready processors have sent their packets unless one of said selected processors indicates it is not ready to send;

means for denying access to the bus to a selected processor which indicates that it is not ready to send when selected by said selecting means and selecting another one of said processors indicated as ready in response to said first poll as a send processor prior to the completion of a data transfer cycle; and

means for conducting a second poll of the processors when all of said processors indicated as ready in response to said first poll have either sent their packet or indicated they were not ready to send.

4,888,685

DATA CONFLICT PREVENTION FOR PROCESSOR WITH INPUT/OUTPUT DEVICE

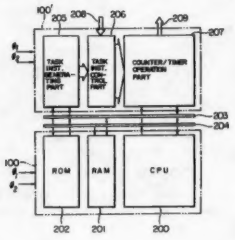
Shigeki Morinaga, and Mitsuru Watabe, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 10, 1986, Ser. No. 850,103

Claims priority, application Japan, Apr. 15, 1985, 60-78418

Int. Cl.[4] G06F *13/38, 13/40*

U.S. Cl. 364—200 **25 Claims**



6. A data processor, comprising:

programmable means for processing data and receiving and operating upon a first clock signal;

input/output means including an arithmetic logic unit and internal register files, for processing data and receiving and operating upon a second clock signal;

third means for storing data;

fourth means including a plurality of elements for transferring data, a first one of said elements extending between said internal register files of said input/output means and said arithmetic logic unit and a second one of said elements extending between said internal register files and said programmable means;

said clock signals having logical levels and being of the same frequency with a difference in phase with respect to one another such that a first of said logical levels of each said clock signals is non-overlapping;

fifth means for precharging said first one of said elements

during certain periods of one of said clock signals and for precharging said second one of said elements during certain periods of the other of said clock signals.

4,888,686

SYSTEM FOR STORING INFORMATION WITH COMPARISON OF STORED DATA VALUES

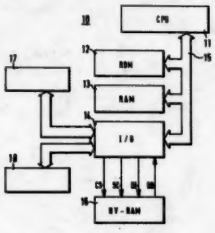
Wolfgang Sinz, Hofheim, and Günther Kotulla, Sulzbach, both of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 19, 1986, Ser. No. 944,255

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1986, 3602112

Int. Cl.[4] G06F *11/14*

U.S. Cl. 364—200 **10 Claims**



1. A system for storing information, comprising:

a non-volatile memory having a plurality of memory locations, the information to be stored comprising a succession of data values; and

storing means for storing a data value repetitively at a first time and a second time respectively in a first and a second memory location of a series of memory locations in said non-volatile memory, a subsequent one of said data values being stored repetitively by said storing means at further times in a further two successive memory locations, there being an odd number of memory locations in said series; and wherein

after a storing of data values in all the locations of said series, storing of a further data value is accomplished by replacing the value of said first location with said further data value, whereby

said plurality of memory locations are reused for further of said data values in cyclic sequence, the storing of repetitive data values at a plurality of differing times preserving the information from a disruption of said system occurring during any one of said differing times; said system further comprising

comparator means connecting with said non-volatile memory for comparing information of one of said memory locations with information of a second of said memory locations to determine a presence of twice-repeated data values in said series of memory locations; and

readout means operative in response to said comparator means for obtaining from said non-volatile memory a last stored value of said data values from a series of said succession of data values, said last value being independent of said system disruption.

4,888,687

MEMORY CONTROL SYSTEM

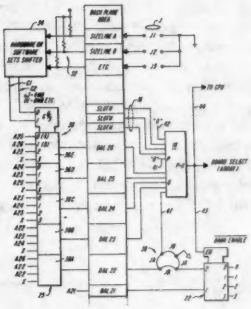
Robert Allison, Medfield, and Brian Lefsky, West Newton, both of Mass., assignors to Prime Computer, Inc., Natick, Mass.

Filed May 4, 1987, Ser. No. 46,456

Int. Cl.[4] G06F *12/06, 13/00*

U.S. Cl. 364—200 **32 Claims**

1. A memory control system for controlling addressing of memory arrays in a computer system which can accept memory arrays of various storage capacity, each memory array including multiple array banks, said memory arrays coupled to a memory backplane area of said computer system having a plurality of connectors corresponding to said plurality of memory arrays, and said memory backplane coupled to an input address bus through said memory control system, said memory control system comprising; address shifter means including multiplexer means having a plurality of segments, each segment coupled to receive a plurality of input address lines of



said input address bus and having an address output, said multiplexer means having a control input, means for establishing a control signal determined by the largest memory array in the backplane, means for decoupling the address output of each multiplexer means segment to a corresponding backplane connector, said multiplexer means placing at said address output of each segment said plurality of input address lines of said input address bus in accordance with said control signal such that proper memory addressing is established.

4,888,688

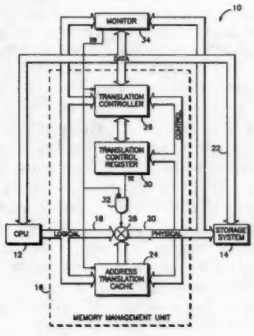
DYNAMIC DISABLE MECHANISM FOR A MEMORY MANAGEMENT UNIT

Jay A. Hartvigsen, Austin, and William C. Moyer, Dripping Springs, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 18, 1987, Ser. No. 98,244

Int. Cl.[4] G06F *12/00, 13/00*

U.S. Cl. 364—200 **6 Claims**



1. A data processing system, comprising:

a memory for storing a plurality of instructions at respective physical addresses;

a processor for executing the instructions, the processor requesting the instructions using logical addresses;

means coupled to the memory and processor for external

monitoring, by a user, of processing activities of the system;

a memory management unit (MMU) for selectively translating the logical addresses to respective physical addresses, said MMU being selectively disabled by the processor to inhibit said translating wherein said MMU outputs logical addresses as physical addresses;

the improvement comprising:

MMU address translation disable means provided in the MMU, said address translation disable means disabling the MMU from performing address translations in response to either a translation enable signal originating from the processor or in response to a dynamic disable signal provided by the means for monitoring; and

control means provided in the MMU and coupled to the processor and memory, said control means selectively reading translation information required by the MMU, but not resident in the MMU, and residing in the memory, and replacing predetermined translation information in the MMU with the required translation information.

4,888,689

APPARATUS AND METHOD FOR IMPROVING CACHE ACCESS THROUGHPUT IN PIPELINED PROCESSORS

Michael D. Taylor; Robert M. Maier; Michael J. Begley, all of San Jose; Allan J. Zmyslowski, Sunnyvale; Jeffrey A. Thomas, Cupertino, and Joseph A. Petolino, Palo Alto, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

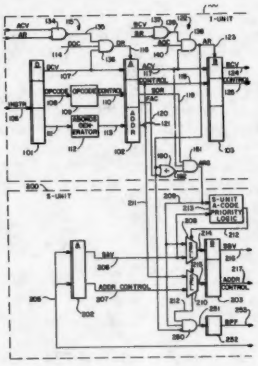
Filed Oct. 17, 1986, Ser. No. 920,805

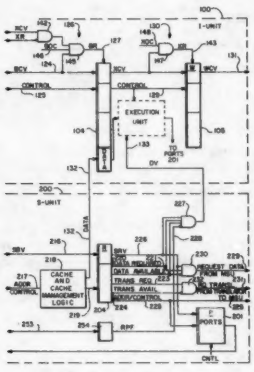
Int. Cl.[4] G06F *13/14*

U.S. Cl. 364—200 **16 Claims**

1. In a data processing system including an instruction unit, a main store storing system data, and a storage unit having a high speed cache storing a subset of the data retrieved from the main store, the instruction unit including a first register receiving instructions including address information in a pipeline fashion and subject to interlocks in which an interlocked instruction held in the first register is prevented from advancing in the pipeline during one or more cycles, the storage unit including at least a first port for holding address information, and cache management logic for managing cache access in response to address information, and further including a selector for selecting address information from the first port in the storage unit or from the first register in the instruction unit for supply to the cache management logic, and selector control logic for assigning priority to the first port and the first register to control the selector in response to the assigned priorities, an apparatus for improving storage unit utilization during interlocks, comprising:

means, coupled to the first register, for generating a control signal during one cycle of an interlock if the interlocked instruction may require cache access; and





means, responsive to the control signal and coupled to the selector control logic, for changing the assigned priority of the first register.

4,888,690

INTERACTIVE ERROR HANDLING MEANS IN DATABASE MANAGEMENT

Val J. Huber, Chelmsford, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Continuation of Ser. No. 40,706, Apr. 17, 1987, abandoned, which is a continuation of Ser. No. 690,800, Jan. 11, 1985, abandoned. This application Mar. 21, 1988, Ser. No. 171,231

Int. Cl.[4] G06F *15/40, 15/04*

U.S. Cl. 364—200 **19 Claims**

1. For use in a relational database management system, interactive error-handling means, comprising

display means and input means,

storage means providing: record occurrence signals comprising record occurrences in a relational database; status signals; currency signals; format signals; and message file signals representing the characters of displayable error message; and providing means defining an operation buffer and first and second record occurrence buffers,

calling means,

operation means, and

fetch means,

said operation means comprising:

means responsive to an operation call signal for validating an operation selected to be performed with respect to record occurrence signals in said second record occurrence buffer and providing an output signal having one of two values, said values representing valid and invalid conditions,

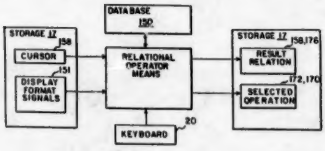
means responsive to a said invalid condition value of said output signal for generating corresponding status invalid signals, and providing an operation return signa,

means responsive to a said valid condition value of said output signal for performing said selected operation with respect to said record occurrence signals, and providing an operation return signal,

said fetch means comprising:

noninteractive means responsive to a fetch call signal, a noninteractive condition, and said currency signals for retrieving record occurrence signals from said database, for placing said retrieved signals into said first and second buffers, for incrementing said currency signals, and for providing a fetch return signal, and

interactive means responsive to a fetch call signal and an interactive condition signal, and comprising



means responsive to said status valid signals and to said currency signals for retrieving said record occurrence signals from said database, and for copying said retrieved signals into said first and second buffers, and

means responsive to said status invalid signals for copying said record occurrence signals from said first to said second buffer, and

display means responsive to said format signals and to said signals in said second buffer for controlling said display to display a representation of said record occurrence, and responsive to operator input signals from said input means, for placing an operation selection signal in said operation buffer, and providing a fetch return signal,

said display means being further responsive to said status invalid signals and said message signals for displaying representations of a said error message with said record occurrence representation, and

said calling means being responsive to said operation return signals and to said status invalid signal for providing a fetch means call signal, and responsive to said fetch return signal for providing an operation call signal.

4,888,691

METHOD FOR DISK I/O TRANSFER

Paul L. George, Westboro; David M. Waxman, Framingham; Randall T. Sybel, Blackstone; Elliot H. Mednick, Millbury; Kevin J. O'Brien, Norfolk, and Joseph M. Spatara, Ashland, all of Mass., assignors to Prime Computer, Inc., Natick, Mass.

Filed Mar. 9, 1988, Ser. No. 166,515

Int. Cl.[4] G06F *13/38*

U.S. Cl. 364—300 **53 Claims**

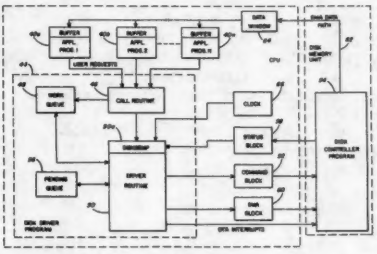
1. In a computer system including a central processing unit (CPU) having a main memory, and a disk memory unit interconnected to the CPU, a method for executing user requests for work by the disk memory unit comprising the steps of:

for each user request received, placing a queue block representative of the user request on a work queue;

constructing a command block for each queue block placed on the work queue, said command block fully defining the user request;

forwarding each command block from the CPU to the disk memory unit for execution;

after each command block has been forwarded to the disk memory unit for execution, transferring the queue block



that is representative of the user request from the work queue to a pending queue;

executing the user requests represented by each command block in an order determined by said disk memory unit; and

removing each queue block from the pending queue after the disk memory unit has completed the user request.

4,888,692

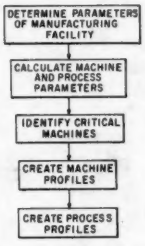
REAL-TIME SCHEDULING SYSTEM

Subhash Gupta; Sanjiv S. Siduh, both of Dallas, and Frank Vlach, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 895,061, Aug. 11, 1986, abandoned. This application Nov. 10, 1988, Ser. No. 273,643

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—402 **7 Claims**



1. A method for controlling operation of a plurality of machines which define a process flow having a plurality of processes, comprising the steps of:

(a) performing a steady state analysis of the process flow to obtain relationships between the processes;

(b) generating a plurality of profiles which represent the results of step (a);

(c) assigning each process to at least one of the machines in a predetermined relationship;

(d) for each process, when a predetermined event occurs, making a scheduling decision based on the current state of the process and the contents of an appropriate profile; and

(e) initiating each scheduled process on an assigned machine in accordance with the decision of step (d).

3. A method for controlling operation of a machine which relates to a plurality of other machines by a process flow having a plurality of process, comprising the steps of:

(a) receiving a profile which relates the operation of the machine to the process flow;
(b) predicting the course of events in a neighborhood of the machine for a limited time;
(c) scheduling an appropriate event based on the results of steps (a) and (b); and
(d) operating the machine at the time scheduled in step (c).

4,888,693

METHOD TO OBTAIN OBJECT BOUNDARY INFORMATION IN LIMITED-ANGLE COMPUTERIZED TOMOGRAPHY

Kwok C. Tam, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 1, 1987, Ser. No. 32,804
Int. Cl.[4] G06K *9/46*; G06F *15/38*
U.S. Cl. 364—413.16 **5 Claims**

1. A method of obtaining object boundary information in limited-angle x-ray computerized tomography comprising:
exposing said object to x-rays at multiple scanning angles within a limited angular range and generating x-ray projection data;
processing, said projection data by doing curve fitting near the edges to more precisely determine end points between attenuated and unattenuated x-rays;
backprojecting the projection data between said end points at every scanning angle to yield a backprojection strip which contains the support of said object, defined as the region where object density is non-zero;
overlapping all of said backprojection strips to construct a region which is a polygon and the convex hull of said object, the smallest convex region containing said object; and
using said constructed region as a priori information on the extent and location of said object and other a priori information, reconstruct and display said object by means of a limited-angle reconstruction technique.

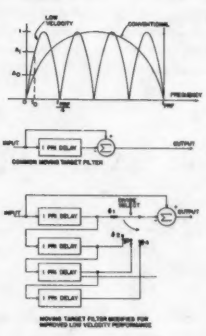
4,888,694

ULTRASOUND IMAGING SYSTEM FOR RELATIVELY LOW-VELOCITY BLOOD FLOW AT RELATIVELY HIGH FRAME RATES

Richard H. Chesarek, Seattle, Wash., assignor to Quantum Medical Systems, Inc., Issaquah, Wash.

Filed Oct. 28, 1987, Ser. No. 114,667
Int. Cl.[4] G06F *11/00, 15/42*
U.S. Cl. 364—413.24 **7 Claims**

1. An ultrasound blood flow imaging system comprising:
an ultrasound transducer having a plurality of transducer elements, each of said transducer elements generating an ultrasound pulse responsive to receipt of a respective electrical transmitter signal, each of said transducer elements further generating an electrical receiver signal responsive to receipt of reflected ultrasound returns;
a transmitter coupled to said ultrasound transducer, said transmitter generating said electrical transmitter signals;
a receiver coupled to said ultrasound transducer, said receiver receiving said electrical receiver signals from said transducer elements;
a controller causing either a single transmitter signal to be applied to one of said transducer elements or a plurality of said transmitter signals to be simultaneously applied to a plurality of respective transducer elements positioned adjacent each other so that said transducer generates an ultrasound pulse at a respective beam location on said transducer, said controller further causing said receiver to process either a single receiver signal from one of said transducer elements or a plurality of receiver signals from a plurality of respective transducer elements positioned adjacent each other at a beam location corresponding to the beam location of said ultrasound pulse, said controller causing said transducer to repetitively generate K sets of ultrasound pulses, each set consisting of a sequence of a single ultrasound pulse generated at each of N different beam locations;
a moving-target bandpass filter having a passband extending from zero hertz to fhd PRF, where f_{PRF} is the frequency at which an ultrasound pulse is generated at each of said N different beam locations;



a data memory recording blood flow data from ultrasound returns generated from said K sets of ultrasound pulses at said N different beam locations;
a filter processor receiving said blood flow data from said data memory, said filter processor generating flow velocity data indicative of the blood flow velocity at each of said N beam locations as a function of the receiver signals generated from M ultrasound pulses at each beam location; ahd
a display receiving said flow velocity data from said filter processor and data from said controller indicative of the beam location at which said flow velocity data is received for providing an image of blood flow beneath said transducer.

4,888,695

SIGNAL PROCESSING METHOD IN AUTORADIOGRAPHY

Hisashi Shiraishi; Tsutomu Kimura, and Kazuhiro Hishinuma, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 6, 1984, Ser. No. 568,876
Claims priority, application Japan, Jan. 8, 1983, 58-1332; Jan. 8, 1983, 58-1333; Mar. 31, 1983, 58-57419
The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—413.13 **12 Claims**

1. A signal processing method in autoradiography for determination of the base sequence of DNA or a DNA fragment, employing radioactively labeled cleavage products obtained by specifically cleaving the DNA or DNA fragment labeled with a radioactive element, comprising the steps of:
(1) providing at least two sets of reference mixtures each consisting essentially of guanine specific cleavage products, adenine specific cleavage products, thymine specific

cleavage products and cytosine specific cleavage products;

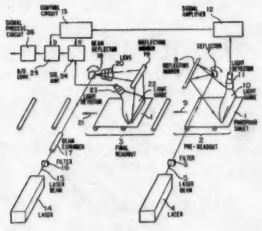
(2) providing at least one group of cleavage products or a mixture thereof containing at least one kind of the base specific cleavage products;

(3) resolving both the reference mixtures provided in step (1) and the product group provided in step (2) one-dimensionally in such parallel relation that the resolved rows of said two sets of reference mixtures (1) sandwich at least one resolved row of the product group (2) to form at least three resolved rows on a support medium;

(4) obtaining an autoradiograph having locational information on groups of radioactively labeled cleavage products contained in said rows on the support medium;

(5) generating an electrical digital signal corresponding to said autoradiograph including said rows

(6) detecting reference sampling points in each resolved reference row of the digital signal;



(7) detecting sampling points in said one resolved row;

(8) joining corresponding reference sampling points in said reference rows to generate plural continuous lines comprising straight lines, polygonal lines or curved lines; and

(9) identifying said sampling points in said one resolved row of the product group (2) by comparison of the last-mentioned sampling points with said continuous lines to thus determine said base sequence of said DNA or DNA fragment.

(9) causing a stimulable phosphor sheet to absorb radiation and;

(10) scanning said stimulable phosphor sheet with an electromagnetic wave to release at least a portion of radiation energy stored in said phosphor sheet in the form of the autordiograph as stimulated emission, and detecting said stimulated emission photoelectrically.

4,888,696

ACTIVELY CONTROLLED AUTOMOTIVE SUSPENSION SYSTEM WITH ACCELERATION AND ANGULAR VELOCITY DEPENDENT ANTI-PITCHING AND/OR ANTI-ROLLING FEATURE

Yohsuke Akatsu, Yokohama; Naoto Fukushima, Kamakura; Yukio Fukunaga, Zushi; Sunao Hano, Yokohama, and Masaharu Satoh, Kanagawa, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Mar. 31, 1988, Ser. No. 176,246

Claims priority, application Japan, Mar. 31, 1987, 62-78323

Int. Cl.[4] B60G *21/06*

U.S. Cl. 364—424.05 **23 Claims**

1. A control system for an automotive suspension system for controlling vehicular attitude comprising:

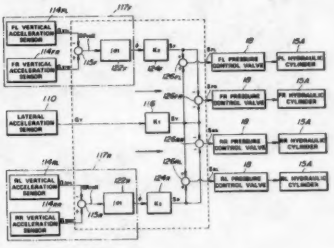
said suspension system disposed between a vehicle body and a suspension member which rotatably supports a vehicular wheel, said suspension system having a variable pressure chamber filled with a working fluid of controlled pressure;

a pressure adjusting means, associated with said variable pressure chamber, for adjusting the pressure of said working fluid in said pressure chamber;

a first sensor means sensing acceleration in vehicular attitude change to produce a first sensor means signal indicative of said attitude change acceleration;

a second sensor means sensing an attitude change creative component which is contained in said first sensor means signal, to produce a second sensor means signal indicative thereof;

a control unit receiving said first and second sensor means



signals, deriving a suspension control second value on the basis of said first sensor means signal and modifying said suspension control signal value on the basis of said second sensor means signal, said control unit outputting a control signal based at least on said modified suspension control signal value to control said pressure adjusting means for adjusting suspension characteristics to suppress said vehicular attitude change.

4,888,697

ELECTRONIC CONTROL APPARATUS WITH DEFINED RESET FUNCTION

Hermann Hemminger, Markgröningen; Eugen Joos, Freiberg; Werner Jundt, Ludwigsburg, and Peter Werner, Wiernsheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

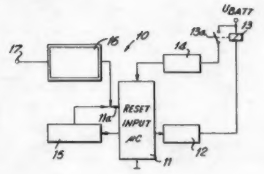
PCT No. PCT/DE86/00379, § 371 Date Oct. 1, 1987, § 102(e) Date Oct. 1, 1987, PCT Pub. No. WO87/04758, PCT Pub. Date Aug. 13, 1987

PCT Filed Sep. 19, 1986, Ser. No. 126,940

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1986, 3603082

Int. Cl.[4] G06F *1/04, 11/00;* G05B *15/02*

U.S. Cl. 364—431.11 **6 Claims**



1. A circuit for resetting computing devices of computer-controlled electrical control systems in motor vehicles, which computing devices are automatically connected to a supply voltage for a predetermined period of time controlled by the computing devices after switching-off an ignition lock switch of the motor vehicle, comprising evaluating means connected to a terminal of said ignition lock switch to produce a reset pulse for said computing devices in response to the switching-on of said switch during restarting of the vehicle, and independent of the automatic connection of said supply voltage to said computing devices, and wherein the switching-on of the igni-

tion lock switch is evaluated by means of differentiation of a switch-on pulse on said terminal of the ignition lock switch.

4,888,698

METHOD FOR STORING A PARCELWISE DIVIDED DIGITAL DATA BASE AS WELL AS OF ADDRESSING A DATA PARCEL IN A MASS MEMORY, AND APPARATUS FOR CARRYING OUT THE METHOD

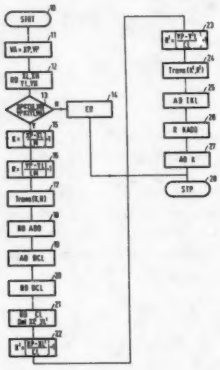
Leonardus M. H. E. Driessen; Cornelis P. Janse, and Paul D. M. E. Lahaije, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 19, 1987, Ser. No. 110,303

Claims priority, application Netherlands, Oct. 23, 1986, 8602654

Int. Cl.[4] G06F *15/50*

U.S. Cl. 364—443 **18 Claims**



1. A method for storing a digital data base in a memory whose capacity is divided into a number of storage parcels each having a predetermined storage capacity, said method comprising the following steps:

dividing the data base into a number of main cells according to a predetermined regular division pattern;

dividing each main cell into a further number of data parcels , so that each data parcel covers a respective part of the main cel, which part has a data content occupying substantially completely the storage capacity of a storage parcel;

setting up an identifier table comprising:

(a) a first identifier identifying said predetermined pattern;

(b) a second identifier identifying said division into a data parcel; and

(c) for each main cell a data parcel list which comprises for each data parcel of that main cell an address pointer indicating at which memory location the respective data parcel is stored; and

loading into said memory the data content of each data parcel at the address indicated by its address pointer and loading said identifier table;

wherein main cells which comprise more than one data parcel are divided according to a further predetermined regular division pattern into such a nuber of base cells that the data content of each base cell is storable in a storage parcel, said parcels being formed by combining each time one or more adjacent base cells of a same main cell, so that each base cell only belongs to one and the same data parcel,

the method further comprising the following steps for setting up said identifier table:

(a) compiling a main cell table comprising said first identifier and further for each main cell divided into base cells a further address pointer indicating a memory location at which a base cell table for that main cell is stored;

(b) forming each main cell divided into base cells said second identifier by forming a number of indices, each index indicating a respective data parcel of its appertaining main cell;

(c) assigning to each base cell the index of the respective data parcel in which it is accommodated; and

(d) compiling for each main cell divided into base cells a base cell table comprising a base cell identifier and a list of

the base cells with their assigned index; each base cell table being loaded at its respective address indicated by its respective further address pointer.

4,888,699

SYSTEM OF NAVIGATION FOR VEHICLES

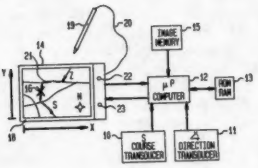
Peter Knoll, Ettlingen; Winfried König, Pfinztal, and Peter Rapps, Karlsruhe, all of Fed. Rep. of Germany, assignors to Robert Bosch GMBH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 022,807, Jan. 13, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 274,654

Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519276

Int. Cl.[4] G06F *15/50*

U.S. Cl. 364—449 **9 Claims**



1. A combination navigation and continuous route-vs-position display system for vehicles having

means (14) for representing a road map,

means (12,13) for continuously displaying on said map instantaneous vehicle position,

means (17,19,22) immediately adjacent said map means (14) for entering a continuous sequence of points representing an origin (S), a destination (Z), and intermediate points, thereby determining a desired trip route (21) therebetween;

means (13), coupled to said entering means, for storing said sequence of points during a trip as said desired trip route;

means (10,11,12,13), coupled to said position displaying means, for detecting and measuring vehicle displacement, and for updating said displayed vehicle position (16) in accordance with said measured displacement, thereby displaying an updated measured position;

means (12,13), coupled to said updating means, for detecting deviation of said updated position from a point on said desired route; and

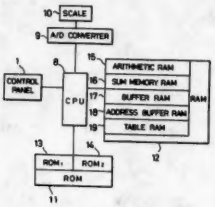
means (12,23,40–43) for continuously correcting any unintentional deviation, of said updated measured position from a point on said desired, previously determined, route, resulting from error in said vehicle displacement detecting and measuring means, and for thereby adjusting and returning said displayed position (16) to an adjacent point on said previously determined and presumptively actual route (21).

4,888,700

APPARATUS FOR PROCESSING CONTENTS OF TOTALIZING MEMORIES IN ELECTRONIC BALANCE ASSEMBLY

Noriyasu Tajima; Suzuki Michio, and Hidemi Mihara, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 943,730, Dec. 19, 1986, abandoned. This application Nov. 22, 1988, Ser. No. 275,657
Claims priority, application Japan, Dec. 24, 1985, 60-291727
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—466 3 Claims



1. An apparatus for storing contents of totalizing memories in an electronic balance assembly, comprising:

an item sign memory for storing, in the form of data related to the items to be weighed, such as the unit weight of an item, the price per unit weight, said item's unit price or the like;

an arithmetic sign memory for storing arithmetic signs for each of said items to be weighed;

a temporary numerical storage memory having a matrix-like memory processing table where processing numerical expressions are set by combination of said data stored in said item sign memory and said arithmetic sign memory, at predetermined locations within said totalizing memories, based upon designated storage addresses for executing programs controlling the issuance of a printed label, with respect to data in said totalizing memories; and

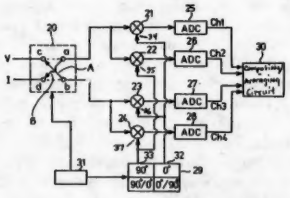
an external input means for designating a desired address in said temporary numerical storage memory and changing and inputting said processing numerical expression thereto.

4,888,701

APPARATUS FOR MEASURING VECTOR VOLTAGE RATIO

Tomio Wakasugi, Hachioji, and Hideshi Tanaka, Koganei, both of Japan, assignors to Hewlett Packard Company, Palo Alto, Calif.

Filed Mar. 4, 1987, Ser. No. 21,864
Claims priority, application Japan, Mar. 4, 1986, 61-46983
Int. Cl.[4] G01R *27/00*
U.S. Cl. 364—482 4 Claims



1. An apparatus comprising:

first and second input terminals;

four phase detectors, each having two inputs and an output;

a source of AC waves having quadrature phases; and

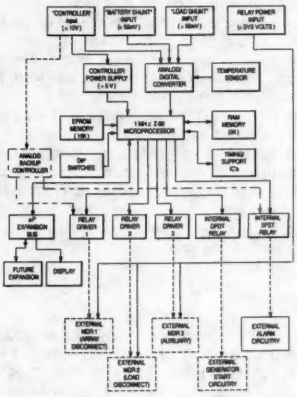
first means for respectively coupling a different combination of one of said first and second input terminals and one of said quadrature phases of said AC waves to the respective inputs of said four phase detectors when in a first mode, and for successively coupling each of four combinations of one of said first and second input terminals and one of said quadrature phases of said AC waves to the inputs of each of said four phase detectors when in a second mode.

4,888,702

PHOTOVOLTAIC SYSTEM CONTROLLER

Kenneth F. Gerken, Olney, Md., and Robert A. Sullivan, Great Falls, Va., assignors to Integrated Power Corporation, Rockville, Md.

Filed Aug. 20, 1987, Ser. No. 87,314
Int. Cl.[4] H02J *7/16*
U.S. Cl. 364—494 19 Claims



1. A photovoltaic system controller for utilization with a photovoltaic power system including at least a photovoltaic array, a system battery adapted to be charged by said array and a load adapted to be powered by said battery, said controller comprising a microprocessor having an erasable programmable memory, said microprocessor having means to receive input data from said array, said battery and said load, said microprocessor having means to evaluate said input data in relation to at least one predetermined setpoint, said microprocessor in response to said evaluation being adapted to disconnect said battery from said array or to disconnect said load from said battery, said setpoint being adapted to be adjusted to a second setpoint by adjustment means, said erasable programmable memory being adapted to be changed whereby said evaluation performed by said microprocessor is also changed.

4,888,703

APPARATUS FOR MONITORING THE TOXICANT CONTAMINATION OF WATER BY USING AQUATIC ANIMALS

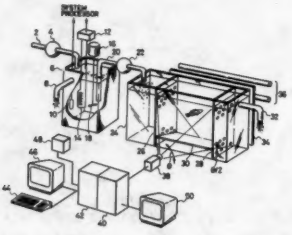
Kenji Baba; Hayao Yahagi; Shoji Watanabe; Naoki Hara, all of Hitachi; Mikio Yoda, Tokai; Shunji Mori, Hitachi; Takashi Iida, Hitachi; Takashi Katori, Hitachi, and Masahiko Ishida, Hitachi, all of Japan, assignors to Hitachi Engineering Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed Sep. 4, 1987, Ser. No. 93,034

Claims priority, application Japan, Sep. 9, 1986, 61-210798; Sep. 9, 1986, 61-210800; Nov. 25, 1986, 61-278830; Dec. 5, 1986, 61-288849; Jan. 16, 1987, 62-6000; Jan. 21, 1987, 62-9878

Int. Cl.[4] G01N *00/00*

U.S. Cl. 364—496 13 Claims



2. An apparatus for monitoring the toxicant contamination of water, comprising:

a basin into which a part of water to be tested is introduced and in which an aquatic animal is bred;

a light source, arranged on the side of one of the side walls of said basin, for lighting up said basin;

a television camera, arranged on the side of the other side wall of said basin opposite to the one side wall, for taking an image of a predetermined area of said basin, said image including an image of the aquatic animal; and,

a processor for processing plural images taken by said television camera during a predetermined observation time period to obtain a frequency distribution of gravity centers of images of the aquatic animal in a vertical direction of the water, and producing an alarm signal, when the behavior of the aquatic animal is judged as being abnormal on the basis of the obtained frequency distribution of gravity centers.

4,888,704

ADVANCED CONTROL STRATEGIES FOR MELT FLOW RATE AND REACTOR CONCENTRATION IN THE POLYPROPYLENE SLURRY PROCESS

Robert J. Topliss, Naperville; Norman F. Brockmeier, Wheaton, and Harold A. Lindahl, Riverside, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 18, 1987, Ser. No. 134,854

Int. Cl.[4] G06F *15/46;* G05D *7/00*

U.S. Cl. 364—500 13 Claims

1. A method for controlling a polypropylene slurry process having a reactor with a vapor phase and a liquid phase to obtain a polypropylene with a desired melt flow rate comprising:

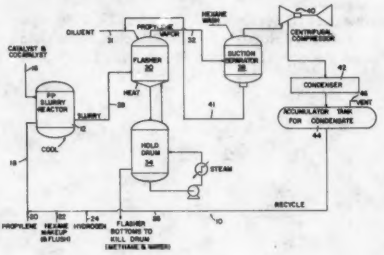
measuring the temperature of the liquid phase and producing a first measurement signal proportional thereto;

measuring the pressure of the vapor phase and producing a second measurement signal proportional thereto;

determining a ratio of hydrogen concentration to propylene concentration in the vapor phase and producing a third measurement signal proportional thereto;

automatically combining the first, second and third measurement signals to produce a computed output signal to determine an instantaneous melt flow rate of the polypropylene being produced in the reactor in response to the first, second and third measurement signals;

comparing the determined instantaneous melt flow rate with the desired melt flow rate of the polypropylene; and



adjusting the ratio of hydrogen concentration to propylene concentration in the vapor phase so as to maintain the ratio at a desired value to produce polypropylene with the desired melt flow rate.

4,888,705

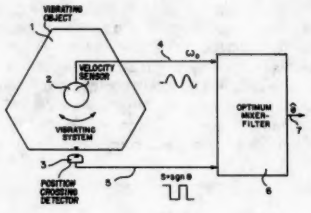
SYSTEM FOR MEASURING THE POSITION OF VIBRATING OBJECT

Bernard Friedland, West Orange, N.J., assignor to Kearfott Guidance and Navigation Corp., Little Falls, N.J.

Filed Oct. 26, 1987, Ser. No. 112,636

Int. Cl.[4] G01C *19/64*

U.S. Cl. 364—508 13 Claims



1. An apparatus for measuring the position of a vibrating object in a dynamic process, comprising:

(a) a velocity sensor continuously measuring the velocity of the object, said velocity sensor providing as an output signal a continuous signal indicative of the velocity of said object;

(b) a non-linear detector for detecting the object position and providing as an output signal a precise signal each time the object crosses a set reference position; and

(c) a non-linear mixer-filter receiving said output signals from said velocity sensor and said non-linear detector, said non-linear mixer-filter operating on said continuous velocity signal and said precise signal by incorporating a model of the dynamic process generating said output signals wherein a continuous optimum estimate of the position of the vibrating object is produced.

8. A method for measuring the position of a vibrating object in a dynamic process, comprising the steps of:

(a) providing as an output from a velocity sensor a continuous signal indicative of the velocity of said vibrating object;

(b) providing from a non-linear detector for detecting the

object position a precise signal when the object crosses a set reference position;

(c) combining said continuous velocity and precise signals in a non-linear mixer filter by incorporating a model of the dynamic process; and

(d) providing an optimum estimate from said non-linear mixer filter of the position of said vibrating object.

4,888,706

FLUID DISTRIBUTION TO MULTIPLE USERS THROUGH DISTRIBUTED INTELLIGENCE SUB-CENTERS

William F. Rush, Tinley Park, and James E. Huebler, Brookfield, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 395,315, Jul. 6, 1982, Pat. No. 4,729,106. This application Feb. 24, 1988, Ser. No. 159,690

Int. Cl.[4] G01F *1/00;* **G08C** *17/00, 19/00*

U.S. Cl. 364—510 **23 Claims**

21. An underground pipeline fluid distribution system to multiple users comprising:

a principal intelligence and distribution center;

a plurality of distributed intelligence sub-centers, each said distributed intelligence sub-center controlling a set of user meters corresponding to each said distributed intelligence sub-center by computing and analyzing data to, determine a given output corresponding to a sensed input;

an underground pipeline system in fluid communication through a supply pipeline with said principal distribution center and said plurality of distributed intelligence sub-centers and in fluid communication through distribution pipelines and branching user pipelines with a user fluid meter serving each said user;

meter computer means at each said user fluid meter capable of individual identification and activation in data communication with its corresponding said distributed intelligence sub-center;

sub-center computer means at each said distributed intelligence sub-center in data communication with and for providing only summary intelligence to said principal intelligence center.

4,888,707

OBJECT COLLISION DETECTION METHOD AND APPARATUS

Kenji Shimada, Kawasaki, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 18, 1988, Ser. No. 233,686

Claims priority, application Japan, Sep. 9, 1987, 62-224232

Int. Cl.[4] B25J *9/00*

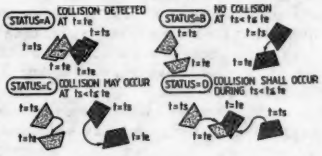
U.S. Cl. 364—513 **20 Claims**

1. An object collision detection apparatus comprising:

means for obtaining the shortest distance between the surface of one object and the surface of another object at the start time and/or the end time of a given check time interval;

means for obtaining the longest movement path length of points on each of said one object and said another object during said check time interval;

determination means for comparing said shortest distance at said start time and/or said end time with the sum of said longest movement path lengths of said one object and said another object, and further for determining whether or



not it is ensured that said one object cannot collide with said another object, according to the result of said comparing.

4,888,708

CONTROL SYSTEM FOR AN INDUSTRIAL ROBOT

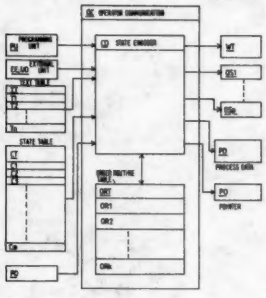
Håkan Brantmark; åke Lindqvist, and Norefors, Ulf-Göran, all of VästerÅs, Sweden, assignors to ASEA Aktiebolag, Västerås, Sweden

Filed Jun. 27, 1983, Ser. No. 508,227

Claims priority, application Sweden, Jun. 28, 1982, 8203974

Int. Cl.[4] G05B *19/42*

U.S. Cl. 364—513 **8 Claims**



1. In a control system for a programmable industrial robot comprising:

first control means for manually controlling the robot during a programming stage for teaching the robot to follow an operating path defined by a number of set points;

memory means for storing coordinates of said set points as position instructions and storing other operating instructions which, together with said set points, define a work cycle of the robot;

second control means for control of the control system during the programming stage and for entering said instructions, and program means for controlling the robot during automatic running of the robot in accordance with information stored in the memory means during the programming stage;

said first and second control means being arranged in a portable programming unit, which is connected to other parts of the control system by means of a communication channel;

the improvement wherein;

the first control means comprises a joystick for controlling movement of the robot;

the second control means comprises a group of control members, each capable of a plurality of different functions, the function of each control member being deter-

mined by the prevailing operating state of the control system; and

the control system further comprising indicating means which, for each control member in said group, indicates the current function of said control member;

said indicating means arranged in said programming unit;

the control system further comprising a state table stored in advance in the memory means, which table for each of the operating states that the system may assume containing information which defines:

(a) the current function of each one of the control members in said group for presentation with the indicating means, and

(b) for each one of the control members, the orders to be carried out by the control system in the current state upon activation of the control member, and the new state the system shall assume after execution of the orders;

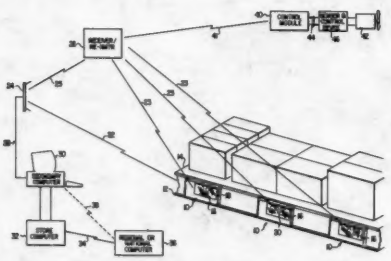
whereby the control system, upon activation of a control member, executes said orders and subsequently presents the functions of the control members in the new state on the indicating means.

4,888,709

ELECTRONIC PRODUCT INFORMATION DISPLAY SYSTEM

Michael S. Revesz, Carrollton; Harold G. Burkett, Jr., Lewisville, and Robert C. Gilbert, Richardson, all of Tex., assignors to Viscom Systems, Inc., Dallas, Tex.

Filed Mar. 27, 1987, Ser. No. 31,396
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—518 **10 Claims**



1. A method for displaying product information at locations proximate to associated products, comprising the steps of:

mounting a plurality of electronic display modules at locations proximate to respective different goods;

programming each module with a module address;

forming a signal comprising address and data parts, the address part representing a module address and the data part representing product information for the module address;

aerially broadcasting said signal as electromagnetic energy selected from the spectral band consisting of infrared and light to the modules from a remote transmitter;

receiving said signal by a plurality of receiving modules, the receiving modules comprising at least some of the electronic pricing modules;

decoding the address part of said signal by each receiving module into a received address;

comparing the received address to the module address for each receiving module;

matching the received address to the module address in at least one addressed module among the receiving modules;

for each addressed module, decoding the data part of the signal into product information;

displaying the stored product information on a display of the addressed module responsive to the step of matching; and

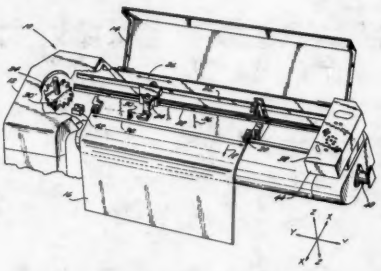
displaying on each module information that changes less often than said product information.

4,888,710

PEN TIP POSITION DETECTOR

John C. Venthem, Georgetown; James A. Parnell, Austin; Mark Hill, and Dan R. Poole, both of Austin, all of Tex., assignors to Ametek, Inc., Austin, Tex.

Filed Dec. 11, 1987, Ser. No. 131,984
Int. Cl.[4] G06K *5/00*; G01D *18/00*
U.S. Cl. 364—520 **30 Claims**



1. Apparatus, for use in conjunction with a digital plotter incorporating controlled multiple marking devices and means for moving the same along a travel path to create displays on a medium, for determining the position of the marking devices along axes of movement, comprising:

(A) a detector assembly, disposed at a fixed axial position relative to the plotter and proximate the travel path of the marking devices, for detecting movement of a marking device relative to said detector assembly and producing signals indicative of the movement, including a pair of beam emitters for producing two intersecting beams of radiation in the travel path of the marking device, and a pair of associated beam detectors to detect the beams and produce first and second signals indicative of the interruptions of the beams caused by a movement of the marking device through the beams, whereby the order in which the first and second signals occur and the difference in the times of occurrence of the first and second signals is functionally related to the axial position of the marking device along a first axis, and the geometry of said detector assembly and the sum of the times of occurrence of the first and second signals is functionally related to the axial position of the marking device along a second axis; and

(B) means for interpreting the signals for determining an axial position of the marking device.

4,888,711

IMAGE INTERPRETATION METHOD AND APPARATUS USING FACES FOR CONSTRAINT SATISFACTION

Van-Duc Nguyen, Albany, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 16, 1987, Ser. No. 121,301
Int. Cl.[4] G09G *1/06*; G06F *15/20*
U.S. Cl. 364—522 **10 Claims**

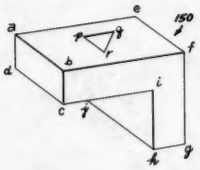
1. A method for intepreting a two dimensional image of a three-dimensional scene on a computer, said two-dimensional image comprising a plurality of vertices, edges and faces, each said vertex being defined by the intersection of at least two said edges in said two-dimensional image, each said face being bound by a closed chain of said edges, each said vertex being associatively linked with its defining intersecting edges and with the faces bounded by the last recited defining edges, each said face being associatively linked with each said edge of the

closed edge chain bounding the face, said method comprising the steps of:

(a) assigning a vertex label, an edge label and a face label respectively to each said vertex, edge and face of said image, each said vertex, edge and face label respectively being selected from predetermined hierarchies of said vertex, edge and face labels;

(b) assuming for each said vertex label a predetermined set of junctions that is consistent with said vertex label, each junction being a possible edge configuration;

(c) assigning for each said face all possible junction loops that are consistent with the face labels assigned to said face, each said junction loop being an n-tuple of said junctions and consisting of one said junction from each of n said vertices respectively at each of n said intersections of the edges bounding said face, each pair of vertices of said image being joined by a common image edge and respectively represented in each said junction loop n-tuple by junctions respectively having the same edge label for said common edge;



(d) assigning for each said edge all possible junction pairs that are consistent with the edge labels assigned to said edge, each said junction pair being a two-tuple of said junctions and consisting of one of said junctions assigned to each said vertex at each end of said edge, within said junction pair the junctions respectively assigned to the vertices at the ends of said edge having the same edge label for that edge; and

(e) performing constraint satisfaction and propagation (CSP) between the linked vertices and edges of said image, between the linked vertices and faces of said image and between the linked edges and faces of said image, the CSP being performed using said junctions, said junction pairs and said junction loops assigned to said vertices, edges and faces of said image, respectively; so that the junctions, junction pairs and junction loops and their respectively corresponding vertex, edge and face labels remaining upon completion of step (e) are descriptive of said three-dimensional scene.

4,888,712

GUARDBAND CLIPPING METHOD AND APPARATUS FOR 3-D GRAPHICS DISPLAY SYSTEM

Anthony C. Barkans, Billerica; Brian D. Schroeder, Lowell; Thomas L. Durant, Billerica; Dorothy Gordon, Somerville, and Jorge Lach, Burlington, all of Mass., assignors to Schlumberger Systems, Inc., Sunnyvale, Calif.

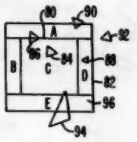
Filed Nov. 4, 1987, Ser. No. 117,112
Int. Cl.[4] G06F *3/14, 15/72*
U.S. Cl. 364—522 **19 Claims**

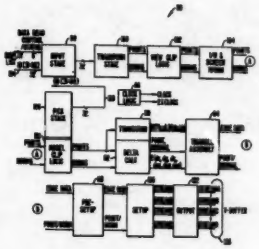
1. A system for clipping polygons representing a three-dimensional objects to produce a representation of the objects in a viewing space defined by a plurality of viewing planes, comprising:

means for determining coordinates of a guardband space defined by a plurality of guardband planes enclosing said viewing space on at least one side;

means for comparing representations of said polygons to said coordinates of said guardband space to determine which polygons intersect at least one of said guardband planes;

means for comparing said representations of said polygons intersecting said guardband planes to coordinates of said viewing space to determine which polygons are two-space polygons which also intersect at least one of said viewing planes; and





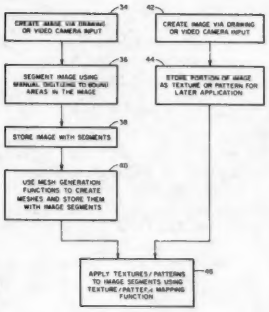
means for clipping by generating new representations for only polygons which intersect both at least one of said guardband planes and at least one of said viewing planes wherein said new representations exclude at least portions of said polygons outside said guardband space.

4,888,713

SURFACE DETAIL MAPPING SYSTEM

Edward K. Falk, Grand Rapids, Mich., assignor to CDI Technologies, Inc., Grand Rapids, Mich.

Filed Sep. 5, 1986, Ser. No. 904,682
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—522 **27 Claims**


34
CREATE IMAGE VIA DRAWING OR VIDEO CAMERA INPUT
42
CREATE IMAGE VIA DRAWING OR VIDEO CAMERA INPUT
36
SEGMENT IMAGE USING MANUAL OUTLINING TO BOUND AREAS IN THE IMAGE
44
STORE PORTION OF IMAGE AS TEXTURE OR PATTERN FOR LATER APPLICATION
38
STORE IMAGE WITH SEGMENTS
40
USE MESH GENERATION FUNCTIONS TO CREATE MESHES AND STORE THEM WITH IMAGE SEGMENTS
46
APPLY TEXTURES/PATTERNS TO IMAGE SEGMENTS USING TEXTURE/PATTERN MAPPING FUNCTION

1. In a computer-assisted design system, a method for providing surface detail to computer generated two-dimensional graphic images of three-dimensional surfaces to create a three-dimensional appearance comprising:

generating a perspective mesh on said computer-generated two-dimensional graphic image such that said mesh creates a three-dimensional visual appearance;

mapping surface detail to said mesh point-by-point such that

said surface detail produces a three-dimensional appearance; and

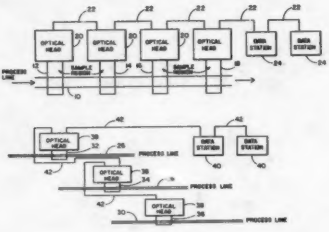
producing a graphic visual image of said two-dimensional graphic image with said surface detail applied.

4,888,714

SPECTROMETER SYSTEM HAVING INTERCONNECTED COMPUTERS AT MULTIPLE OPTICAL HEADS

Larry A. Dingle, Laguna Niguel, Calif., assignor to Laser Precision Corporation, Irvine, Calif.

Filed Sep. 25, 1987, Ser. No. 100,985
Int. Cl.[4] G01J *3/42*; G06F *15/20*
U.S. Cl. 364—525 **7 Claims**



1. A spectrometer system comprising:

one or more digital computer data stations which control the operation of, and acquire data from, other portions of the system;

a plurality of optical heads located remotely from the data stations, each of which optical heads includes a dedicated digital computer and a spectrometer which is controlled by, and which supplies data to, the dedicated computer, in the form of separate frames containing digital information;

a plurality of parallel/serial data conversion nodes, a separate one of such nodes being located at each computer data station and at each dedicated computer;

a plurality of separate serial data carrying connecting cables, each having one end connected to one node and the other end connected to the next node;

the nodes being connected to one another in series, with no node being connected to more than two other nodes;

means at each node for addressing each frame of digital information originated at that node to another node; and

means at each node for rejecting any frame of digital information not addressed to that node.

4,888,715

SEMICONDUCTOR TEST SYSTEM

Tetsuo Tada, and Hideo Matsui, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

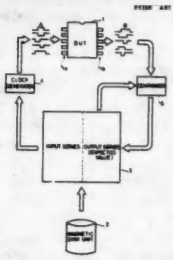
Filed Nov. 19, 1985, Ser. No. 799,726
Claims priority, application Japan, Dec. 3, 1984, 59-255951
Int. Cl.[4] G06F *11/00*
U.S. Cl. 364—550 **9 Claims**

1. A semiconductor test system for testing functions of a semiconductor device and evaluating the same, said semiconductor test system comprising:

first storage means for storing all the output data signals supplied from said semiconductor device to be tested, said semiconductor device operating along a predetermined procedure;

second storage means for storing said predetermined procedure in the form identical to internal machine code specific to said semiconductor device to be tested and for directly supplying said predetermined procedure to said semiconductor device to be tested;

expected value storage means for storing expected values of said all of the output data to be supplied from said semiconductor device to be tested in the form of codes identical to those stored in said first storage means; and



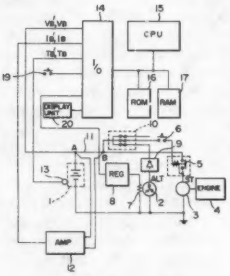
comparator means for directly receiving all the output data signals from said first storage means and said expected value storage means to compare the same with each other to determine whether or not said device is faulty.

4,888,716

LIFE DIAGNOSIS APPARATUS FOR AUTOMOTIVE BATTERY

Sadayasu Ueno, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 13, 1987, Ser. No. 37,852
Claims priority, application Japan, Apr. 14, 1986, 61-84138
Int. Cl.[4] G01N *27/42*
U.S. Cl. 364—550 **4 Claims**



1. In an automobile charge system comprising an alternator driven by an internal combustion engine and a battery charged by the alternator;

an automotive battery life diagnosis apparatus comprising means for detecting the terminal voltage of the battery, means for detecting the charge-discharge current of the battery, means for detecting the temperature signal correlated with the battery, and a controller for processing as predetermined the detection inputs from the detection means;

wherein said controller is mounted on an automobile and includes:

first means for obtaining an initial internal resistance (R_{BP}) of a battery based on a battery voltage and a charge-discharge current before and after a first cranking under the fully charged condition of the battery, and fixedly memorizing at least the initial internal resistance (R_{BP});

second means for obtaining a second internal resistance (R_{BP}) while using the battery based on a battery voltage and a charge-discharge current before and after cranking and temporarily memorizing the second internal resistance (R_{BP});

third means for obtaining a resistance ratio of the initial

internal resistance (R_{BP}) and the second internal resistance (R_{BP}) and means for comparing the resistance ratio with a battery life ratio which indicates the life state of a predetermined battery to judge the life state of the battery under test; and

means for displaying the result on the basis of the output of the function of judging the life state of the battery.

4,888,717

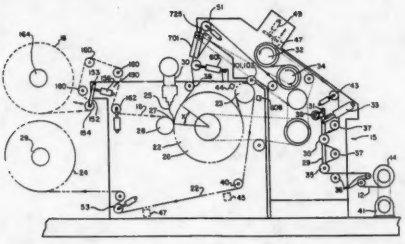
WEB LATERAL POSITION CONTROL APPARATUS AND METHOD

James W. Ditto, Golden, and James W. Jensen, Boulder, both of Colo., assignors to Adolph Coors Company, Golden, Colo.

Continuation-in-part of Ser. No. 667,869, Nov. 2, 1984, Pat. No. 4,610,739. This application Aug. 29, 1986, Ser. No. 902,183

Int. Cl.[4] B65B *41/18*

U.S. Cl. 364—559 **12 Claims**



1. A method of controlling the lateral position of a moving web of material having a central longitudinally extending web axis extending generally parallel to the direction of movement of the web so as to maintain the central longitudinally extending axis of the web at a substantial constant lateral position relative a fixed longitudinally extending axis associated with a fixed web alignment station comprising the steps of:

(a) providing a series of longitudinally spaced apart, substantially identical, generally transversely extending indicia in a longitudinally extending indicia path parallel to the central longitudinal axis of the web, each indicia comprising a first relatively short length linear portion extending diagonally of a longitudinal axis of the web and having a first end and a second end, a second linear portion extending outwardly from the first end of the first linear portion substantially perpendicular to a longitudinally extending axis of the web, and a third linear portion extending outwardly from the second end of the first linear portion substantially perpendicular to a longitudinal axis of the web;

(b) providing a first indicia sensing means at a fixed location opposite the moving web at a position whereat a selected central point of said first linear portion of each indicia is sensed thereby when the web is in a laterally centered state relative said fixed longitudinal reference axis; and whereby points other than said selected central point of said diagonal portion of each indicia are sensed by said first sensing means when the web is in a moderately laterally misaligned state and whereby a point on one of said second and said third linear portion of an indicia is sensed thereby when said web is in a substantially laterally misaligned state;

(c) providing a second indicia sensing means at a fixed location opposite the moving web and laterally spaced from the first indicia sensing means which is adapted to sense a portion of each indicia extending perpendicular of a web longitudinal axis which portion is located at a fixed longitudinal distance from said first diagonally extending portion of each indicia;

(d) generating a first sensing means signal representative of the detection of indicia passing below said first sensing means and generating a second sensing means signal representative of the detection of indicia passing below said second sensing means;

(e) determining the longitudinal distance of web travel occurring between a first sensing means signal portion produced by the sensing of an indicia and a second sensing means signal portion produced by sensing of the same indicia;

(f) determining whether the web is in an aligned, moderately misaligned or substantially misaligned state based upon the determined distance of step (e);

(g) determining the amount of lateral misalignment when the web is in a moderately misaligned state based upon the determined distance of step (e);

(h) moving the web laterally at a fixed relatively fast rate at least until the next following indicia is sensed when the web is determined to be in said substantial misalignment state and moving the web laterally at a rate proportionate to the determined lateral misalignment when the web is determined to be in a moderately misaligned state and maintaining the web at the same lateral position when the web is determined to be in an aligned state.

4,888,718

VOLUME MEASURING APPARATUS AND METHOD

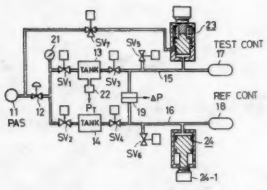
Akio Furuse, Hachioji, Japan, assignor to Kubushiki Kaisha Kosumo Keiki, Tokyo, Japan

Filed Jan. 26, 1988, Ser. No. 148,526

Claims priority, application Japan, Feb. 25, 1987, 62-43914; Mar. 13, 1987, 62-58063

Int. Cl.[4] G01F *1/34*; G01M *3/02*

U.S. Cl. 364—564 **13 Claims**



1. A volume difference measuring apparatus for measuring the volume difference of a container under measurement with respect to a reference container, comprising:

a pair of tank means of substantially the same volume for supplying air to said container under measurement and to said reference container;

means for filling said pair of tank means with air of an equal pressure;

means for providing a known volume variation to one of said containers;

means for measuring the differential pressure between said container under measurement and said reference container;

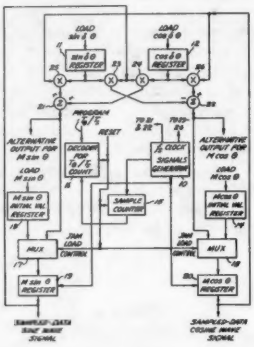
means for computing, from said known volume variation and the difference between a first differential pressure measured by said measuring means without adding said volume variation and a second differential pressure measured by said measuring means after adding said volume variation, a ratio of the difference between said first and second differential pressures to said volume variation, said ratio representing the detection sensitivity of said differential pressure measuring means; and

means for computing the volume difference of said container under measurement with respect to said reference container by multiplying the differential pressure measured by said measuring means and said detection sensitivity.

4,888,719
SAMPLED-DATA SINE WAVE AND COSINE WAVE GENERATION BY ACCUMULATION

Fathy F. Yassa, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 21, 1988, Ser. No. 222,480
Int. Cl.[4] G06F 1/02
U.S. Cl. 364—721 21 Claims



1. Apparatus for accumulating in sampled-data form sine and cosine waves of a given frequency, said apparatus comprising:

means for generating regularly recurring clock signals at a frequency of sampled data, which is substantially higher than the given frequency of said sine and cosine waves;

a sample counter for sequentially counting said clock signals, said counter responding to a reset signal to be reset to a specified count;

a first accumulation register for storing successive values of said sine wave, having an input port and an output port, and responding to each clock signal supplied thereto by said means for generating clock signals to store signal supplied to its input port, thereafter to appear at its output port until the next clock signal is supplied thereto;

a second accumulation register for storing successive values of said cosine wave, having an input port and an output port, and responding to each clock signal supplied thereto by said means for generating clock signals to store signal supplied to its input port, thereafter to appear at its output port until the next clock signal is supplied thereto;

means for detecting when said sample counter is at a count corresponding to a restart, at least one such count being reached by said sample counter before being reset to said specified count;

means for jam loading said first accumulation register with an initial stored value for said sine wave when a count corresponding to a restart is detected;

means for jam loading said second accumulation register with an initial stored value for said cosine wave when a count corresponding to a restart is detected;

means for multiplying the sample at the output port of said first accumulation register by a cosine of an angle to generate a first product signal, said angle being defined as 2π times the period of said clocking signals divided by the period of said sine and cosine waves;

means for multiplying the sample at the output port of said second accumulation register by the sine of said angle to generate a second product signal;

means for applying a sum of said first and second product signals to the input port of said first accumulation register, except when a count corresponding to a restart is detected;

means for multiplying the sample at the output port of said second accumulation register by the cosine of said angle to generate a third product signal;

means for multiplying the sample at the output port of said first accumulation register by the sine of said angle to generate a fourth product signal;

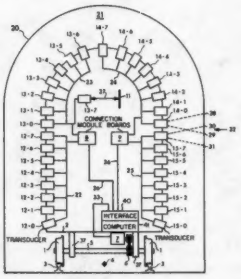
means for applying a difference of said third product signal less said fourth product signal to the input port of said second accumulation register, except when a count corresponding to a restart is detected; and

means for taking as an output signal the signal appearing at one of said ports of said first and second accumulation registers.

4,888,720
TUNNEL MEASURING APPARATUS AND METHOD

Glenn E. Fryer, P.O. Box 1673, Breckenridge, Colo. 90424

Filed Dec. 7, 1987, Ser. No. 129,726
Int. Cl.[4] G01N 29/04
U.S. Cl. 364—506 38 Claims



17. Apparatus for measuring inner dimensions of an inner wall of a tunnel at a plurality of tunnel sites, said apparatus comprising;

an inspection vehicle adapted to move through said tunnel,

a plurality of transducers mounted on said vehicle with there being a clearance between each of said transducers and said tunnel wall with each of said transducers being associated with a different portion of said tunnel wall at each of said sites,

means on said vehicle for operating said transducers at a plurality of tunnel sites as said vehicle travels through said tunnel to generate output signals representing the magnitude of said clearance between each of said operated transducers and said portion of said tunnel wall associated with said each operated transducer at each of said sites within said tunnel, and

means on said vehicle responsive to said generation of said output signals for generating data specifying said magnitude of said clearance at each of said sites between each of said operated transducers and said portion of said tunnel wall associated with said each operated transducer.

4,888,721
ELEMENTARY FUNCTION ARITHMETIC UNIT

Eiki Kondoh; Shigeki Morinaga, both of Hitachi; Takao Yaginuma, Hitachiohta, and Takeshi Asai, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan and Hitachi Engineering Co., Ltd., Hitachi, Japan

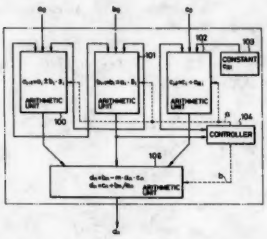
Filed Sep. 9, 1987, Ser. No. 94,752
Claims priority, application Japan, Sep. 9, 1986, 61-212318
Int. Cl.[4] G06F 7/38
U.S. Cl. 364—736 3 Claims

1. An elementary function arithmetic unit comprising:

a constant memory for storing a constant that corresponds to the number of successive iterative operations;

a controller for causing addition or subtraction in the successive iterative operations;

arithmetic units for receiving, as initial values, an argument of an elementary function value to be found and two constants dependent upon the elementaary functions to be found, and subjecting these initial value to n iterative operations to produce elementary function values; and



a further arithmetic unit for subjecting the elementary function values produced by the n iterative operations by said arithmetic units to multiplication, addition, subtraction, or division, or a combination thereof, thereby to produce the thus obtained value.

4,888,722

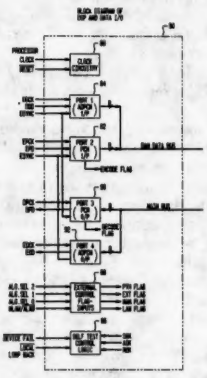
PARALLEL ARITHMETIC-LOGIC UNIT FOR AS AN ELEMENT OF DIGITAL SIGNAL PROCESSOR

Charles P. Boreland, Waterbury, Conn., assignor to General DataComm, Inc., Middlebury, Conn.

Filed Jul. 2, 1987, Ser. No. 69,431

Int. Cl.[4] G06F *7/00, 15/00*

U.S. Cl. 364—736.5 **12 Claims**



1. A parallel arithmetic-logic unit controlled by a microinstruction sequencer, comprising:

(a) a first register for storing data;

(b) a second register for storing data;

(c) a comparator means, including means for setting at least one flag, said comparator means being connected to said first and second registers, for continually comparing the values of the data in said first and second registers and causing said flag setting means to set at least one flag depending on the results of the comparison, wherein said at least one flag is read by said microinstruction sequencer; and

(d) an arithmetic-logic core means connected to said first and second registers for performing at least one of an arithmetic, logic and data move operation on at least the data in one of said first and second registers based on instructions from said microinstruction sequencer which were at least partially formed in response to said at least one flag.

4,888,723

ARRANGEMENT FOR BIT-PARALLEL ADDITION OF BINARY NUMBERS WITH CARRY-SAVE OVERFLOW CORRECTION

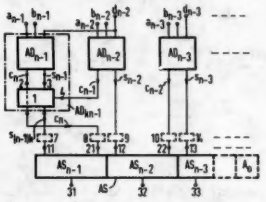
Erik De Man, and Tobias Noll, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin, Munich, Fed. Rep. of Germany

Filed Jun. 10, 1987, Ser. No. 60,169

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1986, 3619437

Int. Cl.[4] G06F *7/50*

U.S. Cl. 364—786 **2 Claims**



1. A circuit arrangement for bit-parallel addition of binary numbers in two's complement having carry-save overflow correction, comprising in combination: a group of n first adders (ADi), where n is a positive integer and i indicates individual ones of said group, each of said first adders having three inputs for binary number bits of the same significance, a sum output and a carry output for manifesting an intermediate sum bit and a carry bit, and an adder device (AS) for the formation of a sum word from a carry word composed of carry bits and from an intermediate sum word composed of intermediate sum bits, whereby the carry bit (C_{n-1}) of the adder (AD_{n-2}) having the second-highest significance is replaced by the carry bit (C_n) of the most significant one of said first adders (AD_{n-1}), and the most significant first adder (AD_{n-1}) has a first correction element (1) connected to receive the carry bit of the second most significant adder, said correction element replacing the intermediate sum bit (S_{n-1}) of the most significant first adder by the carry bit (C_n) of the most significant first adder (AD_{n-1}) in case the carry bits of said most significant first adder and of the second most significant first adder are unequal, said most significant first adder (AD_{n-1}) and said correction element (1) being integrated in one arrangement (AD_{kn-1}), and said most significant first adder (AD_{n-1}) with said correction element (1) having the same number of transistors as the other adders ($AD_0, \ldots, AD_{n-2}$).

4,888,724

OPTICAL ANALOG DATA PROCESSING SYSTEMS FOR HANDLING BIPOLAR AND COMPLEX DATA

Emanuel Marom, Los Angeles; Yuri Owechko, Newbury Park, and Bernard H. Soffer, Pacific Palisades, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 821,378, Jan. 22, 1986, abandoned, and a continuation-in-part of Ser. No. 918,954, Oct. 15, 1986, abandoned. This application Apr. 15, 1988, Ser. No. 181,799

Int. Cl.[4] G06G *7/00*

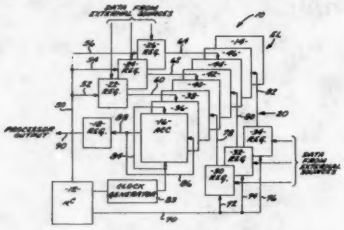
U.S. Cl. 364—807 **28 Claims**

1. An apparatus for optically processing positive and negative numbers, comprising:

first modulator means for spatially modulating an optical beam in response to a first signal that represents a first number and having first and second modulation areas;

second modulator means for spatially modulating the optical beam exiting the first modular means in response to a second signal that represents a second number, and having third and fourth modulation areas where the third and fourth modulation areas each intercept light modulated by both the first and second modulation areas;

light detector means having four light detection areas, the first detection area responsive to light modulated by the first and third modulation areas, the second detection area responsive to light modulated by the second and third modulation areas, the third detection area responsive to



light modulated by the first and fourth modulation areas, and the fourth detection area responsive to light modulated by the second and fourth modulation areas; and

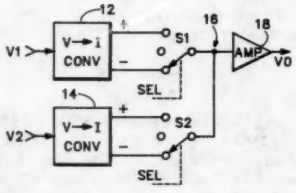
control means for enabling the first signal to modulate the beam at the first modulation area if the first number is positive and to modulate the beam at the second modulation area if the first number is negative, where the degree of modulation at the first and second modulation areas is proportional to the magnitude of the first number, and for enabling the second signal to modulate the beam at the third modulation area if the second number is positive and to modulate the beam at the fourth modulation area if the second number is negative, where the degree of modulation at the third and fourth modulation areas is proportional to the magnitude of the second number.

4,888,725

SUBTRACTION OF WIDE BAND SIGNALS

Earl G. Matney, Newberg, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 13, 1988, Ser. No. 257,255
Int. Cl.[4] H03H 7/10
U.S. Cl. 364—807 **6 Claims**



1. A circuit for substracting two wide band signals without common mode rejection errors comprising:

first means for converting one of the wide band current signals to an inverted current signal;

second means for converting the other wide band signal to a non-inverted current signal; and

means for summing the current signals to produce an output wide band signal that is the difference between the two wide

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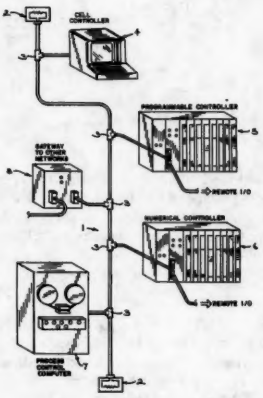
4,888,726

DISTRIBUTED PROCESSING IN A CLUSTER OF INDUSTRIAL CONTROLS LINKED BY A COMMUNICATIONS NETWORK

Odo J. Struger, Chagrin Falls, Ohio, and Barry E. Sammons, Whitefish Bay, Wis., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Apr. 22, 1987, Ser. No. 41,208
Int. Cl.[4] G06F 13/14, 13/00
U.S. Cl. 364—900 **11 Claims**



1. A controller for use in a cluster with other similar controllers that are interconnected with a communications network that enables messages containing data to be broadcast between the controllers, which comprises:

memory means for storing a virtual I/O image table, said table including a section of data for each controller in the cluster;

first broadcast means coupled to the memory means and the communications network for periodically sending a first message on the communications network which broadcasts the controller's own section of data in the virtual I/O image table to the other controllers in the cluster;

first receiver means coupled to the memory means for receiving first messages broadcast on the communications network by other controllers in the cluster and storing the section of data in the corresponding section of the virtual I/O image table in said memory means;

control program storage means for storing a user control program containing instructions which operate an I/O data associated with this controller and T-instructions which operate on I/O data associated with other controllers in the cluster;

prescan means coupled to the control program storage means for identifying T-instructions contained therein;

virtual I/O request message means coupled to the prescan means and the communications network for broadcasting a virtual I/O request message on the communications network to the other controller associated with an identified T-instruction, the virtual I/O request message including data which identifies the I/O data to be operated upon by the identified T-instruction;

means coupled to the virtual I/O request message means for mapping an operand address in each identified T-instruction with a location in the stored virtual I/O image table; and

control program execution means coupled to the control

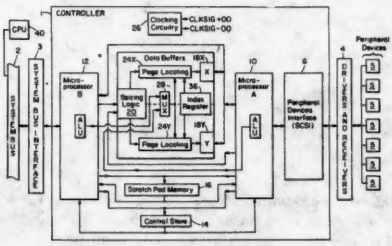
program storage means and the memory means, the control program execution means executing the instructions and the T-instructions in the user control program, wherein the execution of the T-instructions is performed by operating on data in the stored virtual I/O image table.

4,888,727

PERIPHERAL CONTROLLER WITH PAGED DATA BUFFER MANAGEMENT

Edward F. Getson, Jr.; John W. Bradley, both of Peabody, Mass.; Joseph P. Gardner, Merrimack, N.H., and Alfred F. Votolato, Johnston, R.I., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed Jan. 10, 1989, Ser. No. 295,335
Int. Cl.[4] G06F *13/10*
U.S. Cl. 364—900 **17 Claims**



17. A method of managing a paged data buffer located in a controller comprising the steps of:

a. loading a page table into a scratch pad memory wherein each page in the page table is initially marked free;

b. making a request to either read data from or write data to the data buffer;

c. if a write request,

checking for a free page in the page table;

checking to see if any pages have been marked no longer free for this write request;

if no other pages have been marked no longer free for this write request, repeating the steps beginning with checking for a free page;

if other pages have been marked no longer free for this write request, performing the write for the pages already allocated and performing no further steps;

marking a page no longer free;

updating a page RAM to store the page frame address of a page being marked no longer free in a location in the paging RAM;

checking to see that enough pages have been allocated to handle the entire write request;

if not enough pages have been allocated, repeating the above steps;

if enough pages have been allocated, performing the write request; and

d. if a read request,

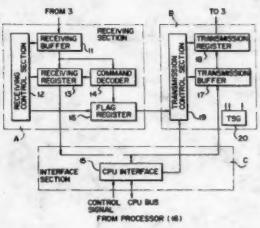
performing the read; and marking pages which were read free in the page table.

4,888,728

MULTIPOINT LINK DATA-TRANSMISSION CONTROL SYSTEM

Masakazu Shirakawa, Tokyo; Hiroaki Yamashita, and Toshio Nishida, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 30, 1987, Ser. No. 31,576
Claims priority, application Japan, Mar. 29, 1986, 61-72130
Int. Cl.[4] G06F *13/00, 11/00*
U.S. Cl. 364—900 **6 Claims**



1. A multipoint link data-transmission control system having a master transmission device to which a master processor is connected, and a slave transmission device connected via a synchronous bus to said master transmission device, to which a plurality of slave processors are connected, said slave processors transmitting message data to said master transmission device, said slave transmission device comprising:

a receiving section comprising decoding means for decoding message data transmitted from said master transmission device via said synchronous bus; said receiving section further comprising;

flag means for indicating whether said slave transmission device transmits or not to said master transmission device, in accordance with a decoded output from said decoding means, said flag means connected to said synchronous bus;

a transmission section comprising transmission data storage means for storing a message data to be transmitted to said master transmission device; said transmission section further comprising,

transmitting means for transmitting the message data stored in said transmission data storage means,

transmission control means for transmitting message data from said transmission data storage means to said transmitting means in accordance with flag data representing the resetting of said flag means during the transmission of the message data from said transmission data storage means, and said transmission control means stopping operation of said transmitting means after detecting that the message data has been sent from said transmission data storage means, said transmission control means being connected to said flag means; and,

said plurality of slave processors transmit the message data from said transmission data storage means to said master transmission device in accordance with a corresponding time slot assigned to each of said plurality of slave processors.

4,888,729

DIGITALLY CONTROLLED OSCILLATOR APPARATUS

Blaine J. Nelson, Plano, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 6, 1988, Ser. No. 190,915
Int. Cl.[4] G06F *1/04*
U.S. Cl. 364—900 **4 Claims**

1. Digital oscillator apparatus comprising, in combination:

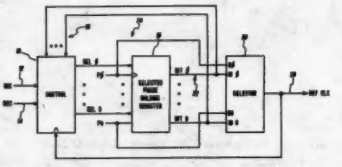
first means for supplying a set N of phase related first signals each of a given frequency;

logic circuits comprising a set N of logic circuits, each of

said logic circuits including phase and select signal inputs and a logic signal output the phase input of each one of said set N of second means being connected to said first means to receive a respective one of said set N of phase related signals of said first means, the appearance of a given logic value signal at said select input thereof being clocked to the logic output thereof as one of a set N of second signals upon the next occurrence of a given transition in the signal applied to said phase input thereof;

third means, connected to said first and second means to receive said sets N of first and second signals, said third means providing a digitally phase controlled output third signal comprising a composite of ones of said first signals having a corresponding second signal in a given logic condition;

fourth means for supplying increment and decrement phase altering fourth signals; and



fifth means, connected to said second, third and fourth means to receive said second, third and fourth signals therefrom an comprising a set N of control elements connected in a ring configuration and only one of said set N of control elements being ON under normal non-phase altering conditions, for generating a set N of select fifth signals for application to said select inputs of said second means, the occurrence of a phase altering fourth signal activating another control element, adjacent to the control element presently in an ON condition, to an ON condition in accordance to whether the phase is to increment or decrement, the previously ON control element staying in an ON condition until receipt of a second signal of the given logic value confirms that the phase alteration has taken place in a MAKE BEFORE BREAK algorithm before the previously ON control element proceeds to an OFF condition.

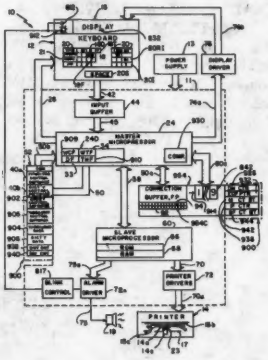
4,888,730

MEMORY TYPEWRITER WITH COUNT OF OVERUSED WORDS

Doris J. McRae, Danbury, Conn., and Richard E. Roberts, Cortland, N.Y., assignors to Smith Corona Corporation, Cortland, N.Y.

Filed Jan. 5, 1988, Ser. No. 141,032
Int. Cl.[4] B41J *5/08*; G06F *3/09*
U.S. Cl. 364—900 **12 Claims**

1. A word-processing system having a memory; character, format and control data input to the system through a keyboard with a plurality of alphanumeric and function keys depressible by an operator, and a display; in combination with at least one discrete file of editable text stored within said memory, said file containing a plurality of words, some of said words being identical to previous words in said plurality and others being differentiable relative to previous words therein; a correction buffer in said memory normally storing data entered through said keyboard and held for editing purposes, said correction buffer having a number of storage positions corresponding to a full-page of characters; address means for accessing said storage position in said correction buffer, sequence control means for producing first a cleared state of said correction buffer in response to pressing at least one of said depressible keys after processing each full-page; reading means operable subsequent to producing said cleared state and causing at least a portion of said plurality of words in the file to be read word-by-word, beginning with a first word in said full-page of characters in said correction buffer; writing means likewise responsive to producing said cleared state and operable under control of said address means to store in the correction buffer said first word read by said reading means; a first frequency-of-use count element associated with said first word and located in said correction buffer at a predetermined position relative to said first word stored therein, said writing means concomitantly entering an initial count of unity in said first frequency-of-use count element; means, including an identity output, operable for comparison thereafter of each next word successively read from said file with each word currently stored in said correction buffer, said means for comparison issuing said identity output when said next word is identical to a particular one of said currently stored words upon comparison therewith, and absence of issuance of the identity output after comparison



of the next word with all words currently stored in the correction buffer indicating the next word to be a differentiable word, said writing means then storing said differentiable word in said correction buffer in association with a respective frequency-of-use count element located at said predefined position relative to the differentiable word, said writing means concomitantly entering an initial count of unity in said respective frequency-of-use count element; and incrementing means responsive to said identity output, said incrementing means augmenting the count by one in the frequency-of-use count element respectively associated with said particular one of the currently stored words and located at said predefined position relative thereto when said identity output is produced; whereby for each word in the correction buffer a count of the number of times the word is used within the full-page is maintained and a determination may be made as to whether any words stored in the correction buffer are overused.

4,888,731

CONTENT ADDRESSABLE MEMORY ARRAY SYSTEM WITH MULTIPLEXED STATUS AND COMMAND INFORMATION

Patrick T. Chuang; Robert L. Yau, both of Cupertino; Hiroshi Yoshida, Santa Clara, and Moon-Yee Wang, Cupertino, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed May 11, 1988, Ser. No. 193,308
Int. Cl.[4] G11C *13/00, 15/00*
U.S. Cl. 365—49 **10 Claims**

1. A content addressable memory system comprising:

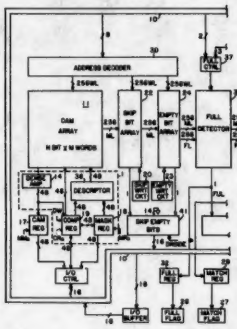
an array of memory cells having an input and an output and arranged in rows and columns in an array of N bit cells by M words, with N bits per word;

a comparand register having a capacity of N bits, said comparand register having an input and an output,

means connecting said comparand register output to said input of said array of memory cells;

an I/O bus carrying data, commands, and status information and having a bit capacity S which is a submultiple of N;

means connecting said I/O bus to said input of said comparand register;



means for supplying bits of said data from said I/O bus to said comparand register in cycles of no more than S bits per cycle;

means for comparing said data supplied to said comparand register bit for bit with the contents of each of said M words in said array of memory cells; and

means for indicating a match between said supplied data from said comparand register and the contents of one or more of said M words in said array of memory cells.

4,888,732

DYNAMIC RANDOM ACCESS MEMORY HAVING OPEN BIT LINE ARCHITECTURE

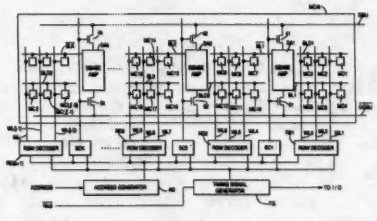
Michihiro Inoue, Ikoma, and Toshio Yamada, Sakai, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 18, 1988, Ser. No. 157,263

Claims priority, application Japan, Feb. 23, 1987, 62-39419; Oct. 2, 1987, 62-250129

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—51 **2 Claims**



1. A dynamic random access memory for writing information into memory devices connected to bit lines and for reading out information therefrom, comprising: bit lines and word lines; plural memory arrays disposed in an open bit memory array composition having memory devices disposed at all intersections of said bit lines and word lines; a sense amplifier row composed of a plurality of sense amplifiers disposed among said plural memory arrays, said plurality of sense amplifiers composing the sense amplifier row being arranged at a pitch which is double that of the pitch of said bit lines; wherein one of two pairs of it line pairs of said sense amplifier row which are arranged so as to be opposite to each other across a sense amplifier is connected to the sense amplifier, while bit lines isolated from the same sense amplifier are connected to two sense amplifiers which are adjacent to the same sense amplifier.

4,888,733

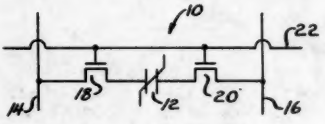
NON-VOLATILE MEMORY CELL AND SENSING METHOD

Kenneth J. Mobley, Colorado Springs, Colo., assignor to Ramtron Corporation, Colorado Springs, Colo.

Filed Sep. 12, 1988, Ser. No. 243,414

Int. Cl.[4] G11C *11/22, 7/00*

U.S. Cl. 365—145 **17 Claims**



1. A non-volatile memory cell arrangement comprising a ferroelectric capacitor having two plates, a first bit line, a first switching device coupling one plate of said ferroelectric capacitor to said first bit line, a second bit line, a second switching device coupling the other plate of said capacitor to said second bit line, a first temporary storage device coupled to said first bit line, and a second temporary storage device coupled to said second bit line.

4,888,734

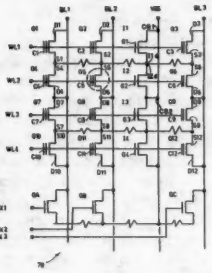
EPROM/FLASH EEPROM CELL AND ARRAY CONFIGURATION

Wung K. Lee, San Jose, and Stephen S. Chiao, Saratoga, both of Calif., assignors to Elite Semiconductor & Systems Int'l., Inc., San Jose, Calif.

Filed Dec. 28, 1987, Ser. No. 139,885

Int. Cl.[4] G11C *11/40*

U.S. Cl. 365—185 **12 Claims**



1. An ultraviolet light erasable EPROM structure comprising:

a plurality of EPROM cells, each including a transistor having a control gate electrode, a floating gate electrode with opposite sidewalls, a channel ending in junctions self-aligned under respective ones of said sidewalls, a source region and a drain region extending from opposite end junctions of said channel, said EPROM transistors being arranged in rows and columns as an array, EPROM transistors within each said row having their control gate electrodes inter-connected by a respective wordline to the

control of its row and EPROM transistors within each said column having their drain regions inter-connected by a respective bitline to the drain regions of the EPROM transistors in the other rows of that column, characterized in that said structure further includes in each row at least one MOS isolation transistor which has a gate electrode connected to the wordline in that row, has a drain region connected to the source regions of the EPROM transistors in that row, and has a source region connected to a ground potential terminal, whereby a reading potential applied to a selected wordline causes an isolation transistor which has its gate electrode connected thereto to conduct current from the EPROM transistor source regions connected to the drain region of said isolation transistor through said isolation transistor and hence to said ground potential terminal.

4,888,735

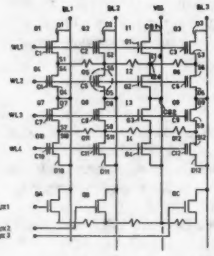
ROM CELL AND ARRAY CONFIGURATION

Wung K. Lee, San Jose, and Stephen S. Chiao, Saratoga, both of Calif., assignors to Elite Semiconductor & Systems Int'l., Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 139,885, Dec. 30, 1987. This application Apr. 28, 1988, Ser. No. 187,171

Int. Cl.[4] G11C *11/40*

U.S. Cl. 365—185 **13 Claims**



1. A ROM structure comprising:

a plurality of ROM cells, each including a transistor having a gate electrode with opposite sidewalls, a channel ending in junctions self-aligned under respective ones of said sidewalls, a source region and a drain region extending from opposite end junctions of said channel, said ROM transistors being arranged in rows and columns as an array, ROM transistors within each said row having their gate electrodes inter-connected by a respective wordline to the gate electrodes of the ROM transistors in the other columns of its row and ROM transistors within each said column having their drain regions inter-connected by a respective bitline to the drain regions of the ROM transistors in the other rows of that column, characterized in that said structure further includes in each row at least the MOS isolation transistor which has a gate electrode connected to the wordline in that row, has a drain region connected to the source regions of the ROM transistors in that row, and has a source region connected to a ground potential terminal, whereby a reading potential applied to a selected wordline causes an isolation transistor which has its gate electrode connected thereto to conduct current from the ROM transistor source regions connected to the drain region of said isolation transistor through said isolation transistor and hence to said ground potential terminal.

4,888,736

SEMICONDUCTOR MEMORY DEVICE USING STORED CAPACITOR CHARGE FOR WRITING DATA

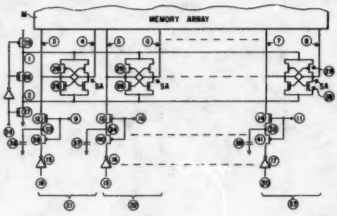
Masashi Hashimoto, Ami, and Masayoshi Nomura, Tsuchiura, both of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 12, 1988, Ser. No. 142,972

Claims priority, application Japan, Jan. 14, 1987, 62-7167

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—189.01 **7 Claims**



1. A memory device comprising:

a dynamic memory cell;

a bit line connected to said dynamic memory cell;

data input means operably connected to said bit line for writing data in said dynamic memory cell;

transistor switch means in said bit line and including a transistor having a gate and normally disposed in a non-conductive state;

a capacitance element connected to a node on said bit line disposed on the opposite side of said transistor from said dynamic memory cell;

said data input means providing a charge on said bit line when said transistor is non-conductive;

said capacitance element receiving and storing said charge from said data input means;

a voltage source connected to the gate of said transistor and operable to supply voltage thereof to render said transistor conductive; and

data being written into said dynamic memory cell from the discharging of charge stored in said capacitance element in response to the application of voltage from said voltage source to said gate of said transistor rendering said transistor conductive.

4,888,737

SEMICONDUCTOR MEMORY DEVICE

Yoichi Sato, Iruma, Japan, assignor to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Jan. 26, 1988, Ser. No. 148,432

Claims priority, application Japan, Jan. 26, 1987, 62-14058

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—203 **19 Claims**

1. A semiconductor memory device comprising:

a plurality of word lines, a pair of first data lines, and a pair of second data lines provided corresponding to said pair of first data lines;

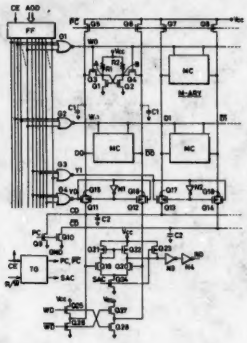
a plurality of memory cells coupled with each of said word lines and with said pair of first data lines;

switch means for electrically separating or coupling said pair of first data lines and said pair of second data lines;

first precharge means for setting the voltage of said pair of first data lines to a first voltage level other than a ground voltage level;

second precharge means for setting the voltage on said pair of second data lines to a ground voltage level; and

a sense amplifier coupled with said pair of second data lines, wherein information in a selected memory cell is transmit-



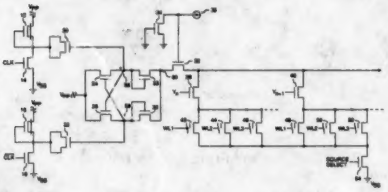
ted to said sense amplifier through said pair of first data lines, said switch means, and said pair of second data lines.

4,888,738

CURRENT-REGULATED, VOLTAGE-REGULATED ERASE CIRCUIT FOR EEPROM MEMORY

Ting-Wah Wong, San Jose, and Raul-Adrian Cernea, Walnut Creek, both of Calif., assignors to Seeq Technology, San Jose, Calif.

Filed Jun. 29, 1988, Ser. No. 212,974
Int. Cl.[4] G11C 7/00; G05F 3/16
U.S. Cl. 365—218 6 Claims



1. A memory circuit including a plurality of EEPROM transistors, each of said transistors including a source and a drain, and an erase circuit, said erase circuit including:

first and second constant current sources,

means for alternately activating said first and second current sources,

first current coupling means for coupling currents from said first and second constant current sources to first and second nodes, respectively,

second current coupling means for combining said currents into an erasing current at a third node,

means for selecting one of said EEPROM transistors to be erased,

means for coupling said erasing current to the drain of said selected EEPROM transistor,

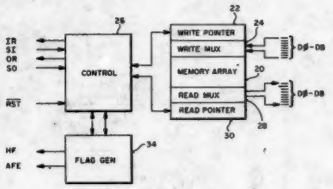
means for sensing the voltage at the drain of said selected EEPROM transistor and for deactivating said means for coupling said erasing current when the voltage at the drain of said selected EEPROM transistor reaches a predetermined value.

4,888,739

FIRST-IN FIRST-OUT BUFFER MEMORY WITH IMPROVED STATUS FLAGS

Bruce Frederick, Los Gatos, and Paul Keswick, San Jose, both of Calif., assignors to Cypress Semiconductor Corporation, San Jose, Calif.

Filed Jun. 15, 1988, Ser. No. 207,249
Int. Cl.[4] G11C 7/00, 19/00
U.S. Cl. 365—221 8 Claims



1. A FIFO buffer memory comprising:

a dual port memory array having a plurality of storage locations, said memory array including input means for writing data from at least one input terminal to said memory array for storage, and output means for reading data from said memory means and presenting said data on at least one output terminal;

control means coupled to said dual port memory array for receiving shift-in signals and causing data presented on said input terminal to be written into successive locations in said memory array in response thereto, and for receiving shift-out signals and causing data in successive locations in said memory to be presented on said output terminal on a first-in first-out basis, and;

flag generating means for generating at least one flag indicative of at least one memory content condition other than one of a full and an empty, said flag generating means including:

(a) counter means responsive to shift-in and shift-out signals to provide a counter means output representing the difference in the number of write and read operations performed in the memory array,

(b) first delay means responsive to shift-in and shift-out signals to provide a first time delay signal delayed in time by an amount adequate to allow said counter means output of said counter means to settle to a new value after a shift-in or shift-out signal is coupled thereto,

(c) first latch means couple to said counter means and said delay means, said first latch means being responsive to said first time delay signal to latch said output thereinto and to provide the same as a first latch means output,

(d) decoder means coupled to said first latch means and responsive to the output thereof to provide a decoder means output indicative of at least one memory content condition other than one of a full and an empty,

(e) second delay means responsive to shift-in and shift-out signals to provide at least one second time delay signal delayed in time with respect to said first time delay signal by an amount adequate to allow said decoder outputs to settle to a new values after a change in said first latch means output, and,

(f) second latch means coupled to said decoder means and said second delay means to clock said decoder outputs into said latch responsive to said second delay means, whereby the data in said second latch means is substantially continuously indicative of at least one memory content condition other than one of a full and an empty.

4,888,740

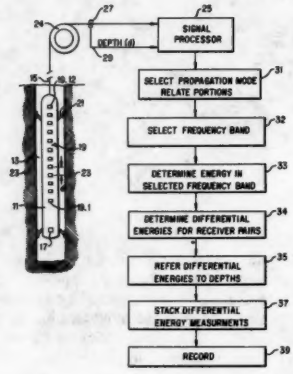
DIFFERENTIAL ENERGY ACOUSTIC MEASUREMENTS OF FORMATION CHARACTERISTIC

Alain Brie, Mendon, France; Kai Hsu, Danbury, Conn., and Richard A. Plumb, North Tarrytown, N.Y., assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 686,127, Dec. 26, 1984, Pat. No. 4,870,627. This application May 30, 1986, Ser. No. 869,384

Int. Cl.[4] G01S *1/30*

U.S. Cl. 367—30 47 Claims



1. A method for measuring characteristics of subsurface earth formations penetrated by a borehole from waveforms received by an array of at least three acoustic pulse receivers spaced axially along said borehole in response to a series of acoustic pulses generated by an acoustic pulse transmitter as said transmitter and receivers are moved along said borehole in fixed relationship with one another, said method comprising the steps of:

(a) determining for each of said waveforms a differential energy measurement for a given acoustic propagation mode and a given receiver pair, said differential energy measurement being representative of the differential energies between said given receiver pairs as they correspond to locations along the borehole, thereby obtaining a plurality of said differential energy measurements based on the plurality of acoustic pulses;

(b) assigning each of said differential energy measurements a depth reference associated with the location of said given receiver pairs at the time corresponding to the receipt of said waveforms; and

(c) stacking said plurality of differential energy measurements for each depth reference.

4,888,741

MEMORY WITH CACHE REGISTER INTERFACE STRUCTURE

Christopher W. Malinowski, Melbourne Beach, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Dec. 27, 1988, Ser. No. 289,748

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—230.05 16 Claims

1. A memory comprising:

a data input port and a data output port;

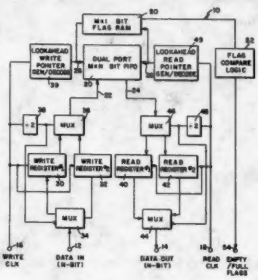
first and second write registers;

first and second read registers;

memory means having write, read and address ports;

write control means for alternating connection of said first and second write registers between being connected respectively to said data input port and write ports and being connected respectively to said write and data input ports, in response to write operation commands;

read control means for alternating connection of said first



and second read registers between being connected respectively to said data output and read ports and being connected respectively to said read and data output ports, in response to read operation commands.

4,888,742

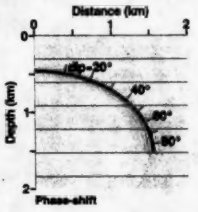
METHOD OF MIGRATING SEISMIC DATA

Craig J. Beasley, Houston, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Nov. 3, 1987, Ser. No. 116,388

Int. Cl.[4] G01V *1/36*

U.S. Cl. 367—53 3 Claims



1. An improved method for migrating seismic data, comprising the steps of:

(a) generating a root-mean-squared (RMS) velocity function from said seismic data, the RMS velocity function having a maximum velocity and being substantially identical to a velocity function required to migrate the seismic data in a single stage;

(b) partitioning the RMS velocity function into a predetermined number of velocity intervals, the number of intervals being a function of a number of migration stages contemplated in migrating the seismic data, each velocity interval having a threshold velocity and a minor velocity function representing a portion of the RMS velocity function;

(c) vertically and spatially stretching said seismic data within each velocity interval according to the expression

$$t_s^2 = \frac{2}{V_f^2} \int_0^t \sigma V_{RMS}^2(\sigma) d\sigma$$

where $V_{RMS}(t)$ is the RMS velocity, V_f is a constant velocity, t_s is the stretch time, and σ is a variable of integration;

(d) migrating the seismic data a plurality of times, each time

using the minor velocity function from the uppermost velocity interval which is incompletely migrated until each velocity interval is fully migrated;

(e) unstretching said seismic data within each fully migrated velocity interval according to the expression given in step (c) whereby the sequence of unstretching is accomplished in reverse and inverse sequence to that set forth; and

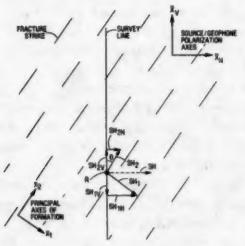
(f) repeating steps (c) through (f) for each migration stage using output from a previous migration stage as input for a subsequent migration stage.

4,888,743

METHOD OF SEISMIC SURVEYING FOR RESOLVING THE EFFECTS OF FORMATION ANISOTROPY IN SHEAR WAVE REFLECTION SEISMIC DATA

Leon A. Thomsen, Tulsa, Okla., assignor to Amoco Corporation, Chicago, Ill.

Filed Oct. 30, 1986, Ser. No. 925,756
Int. Cl.[4] G01V *10/36*
U.S. Cl. 367—75 20 Claims



1. A method of seismic exploration along a line of survey, wherein the line of survey is at an oblique angle to the unique axis of a subterranean azimuthally anisotropic formation comprising the steps of:

a. imparting first shear wave seismic energy into the earth at selected points along the line of survey with a first shear wave source having a first polarization with respect to the line of survey;

b. recording first signals representative of the earth's response to the first shear wave source at selected points along the line of survey with first geophones having a first polarization with respect to the line of survey;

c. imparting second shear wave seismic energy into the earth at selected points along the line of survey, with respect to a second shear wave source having a second polarization with the line of survey;

d. recording second signals representative of the earth's response to the second shear wave source at selected points along the line of survey with second geophones having a second polarization with respect to the line of survey, and

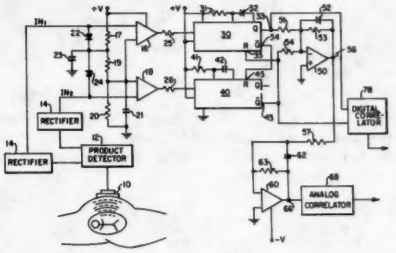
e. with a measure of the oblique angle between the line of survey and the unique axis of the subterranean azimuthally anisotropic formation to be surveyed, processing the first and second signals to obtain principal component signals representative of the anisotropic formation along first and second axes so as to ameliorate the effects of shear wave birefringence on the first and second signals.

4,888,744

PULSED DIRECTIONAL DOPPLER FREQUENCY DOMAIN OUTPUT CIRCUIT

John H. Keeler, North Haven, Conn., assignor to American Home Products, New York, N.Y.

Filed Nov. 15, 1988, Ser. No. 271,743
Int. Cl.[4] G01S *15/02*
U.S. Cl. 367—90 8 Claims



1. An apparatus for receiving a doppler shift signal with upper and lower sidebands representative of the motion of an object under examination toward and away from a receiver, respectively, and producing an output indicative of at least the rate of motion, comprising:

(a) converter means for receiving the doppler shift signal and creating separate upper and lower sideband signals;

(b) comparator means for separately comparing said upper sideband and said lower sideband signal to a threshold level and producing compared sideband signal outputs at one level whenever the sideband signals exceed the threshold and at a second level when they do not;

(c) digitizing means for producing an output indicative of at least the rate of motion of the object under examination and for digitizing the compared sideband signals by creating digitized upper and lower sideband signals in the form of pulses of uniform width and amplitude for at least each transition in one direction of each of said compared sideband signal outputs, wherein the digitizing means comprises an upper sideband monostable multivibrator and a lower sideband monostable multivibrator, each triggered by the rising edges of the respective compared sideband signals from said comparator means; and

(d) integrator means comprising an operational amplifier, a capacitor connected from the output to its inverting input of the operational amplifier, and wherein the output of the upper sideband monostable and the complimentary output of the lower sideband monostable are connected through separate resistors to the inverting input of the operational amplifier.

4,888,745

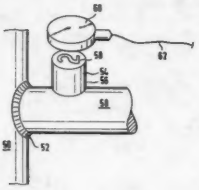
APPARATUS FOR MARKING INDIVIDUAL POINTS OF AN UNDERWATER CONSTRUCTION

Karl G. Walther, Schwerte, and Ronald G. Walther, Aachen, both of Fed. Rep. of Germany, assignors to Magfoil & Inspektionstechniken GmbH, Lubeck, Fed. Rep. of Germany

Filed Sep. 20, 1988, Ser. No. 246,698
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 3731709
Int. Cl.[4] G01S *5/18*
U.S. Cl. 367—129 7 Claims

1. An apparatus for marking and finding individual points of an underwater construction, such as weld seams to be investigated of an underwater pipeline or the like, characterized by a plurality of ultrasonic transmitters which are adapted to be secured to the points of the underwater construction to be

marked and found and which are provided with a luminous mark, and at least one ultrasonic receiver which is adapted to



be positioned near one of the ultrasonic transmitters and is connected to a line via which a signal emitted by the ultrasonic transmitter can be transmitted.

4,888,746

FOCUSSING ULTRASOUND TRANSDUCER

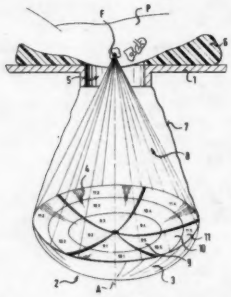
Helmut Wurster, Oberderdingen, and Werner Krauss, Maulbronn, both of Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Knittlingen, Fed. Rep. of Germany

Filed Sep. 14, 1988, Ser. No. 244,714

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732131

Int. Cl.[4] H04B *1/02*

U.S. Cl. 367—138 **16 Claims**



1. In a focussing transducer for generating ultrasound pulses for the destruction of objects internal to the patient's body, which comprises a spheroidal cup having a mosaic of piezoelectric transducer elements forming the concave surface of the cup, which piezoelectric elements may be energised into oscillation by means of a control apparatus to generate ultrasound pulses having a waveform, the transducer having its focus located on the transducer axis and being alignable on an object, and the ultrasound pulses generated being transmissible to the patient's body via a coupling fluid, the improvement which comprises:

an active transducer surface which is subdivided into several areas which are each aligned on a transducer focus, and which each have a selected number of transducer elements allocated to them, and

means for adjusting the waveform of the ultrasound pulses, comprising means for optionally energising the transducer areas serially, in parallel, singly, in groups, and all together in order to adjust the waveform of the ultrasound pulses, said optionally energising means operative to energize the transducer areas in a manner adapted to destroy objects internal to the patient's body.

4,888,747

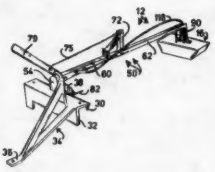
SONAR TRANSDUCER CONTROL ARM ASSEMBLY FOR FISHERMEN

C. W. Williams, Rte. 2, Box 163, Lewisville, Ark. 71845

Filed Jan. 17, 1989, Ser. No. 297,656

Int. Cl.[4] H04R *15/00*

U.S. Cl. 367—173 **1 Claim**



1. A boat-mounted transducer flotation assembly for enabling a fisherman to remotely position a depth-finder transducer in a hard-to-reach area upon the surface of the water apart from his boat, said assembly comprising:

a rigid frame for operatively mounting said assembly, said frame comprising a rigid L-bracket adapted to be secured to the side of said boat, a supportive strut which extends rearwardly from said L-bracket and is adapted to be secured to the floor of said boat, an arcuate strut portion extending upwardly from said L-bracket and terminating in a forward receptive tip, and an axle captivated by said tip;

an elongated control boom pivotally coupled to said frame and extending generally horizontally outwardly therefrom, said control boom comprising:

a first rigid, elongated control arm member comprising rigid sleeve-like bearing means penetrated by said axle for enabling said control boom to pivot horizontally relative to said frame;

a second rigid control arm member connected to said first control arm member and vertically pivotal with respect thereto, said second member comprising a rigid vertical offset projecting upwardly therefrom; and,

spring means for normally yieldably biasing said first and second control arm members into a fully horizontally extended position, said spring means coupled at one end to said first control arm member and at its opposite end to said offset, whereby as said second control arm member pivots downwardly relative to said first control arm member, gradually increasing spring tension is applied;

lock means for selectively frictionally engaging said bearing means to at least temporarily lock said boom in a desired position relative to said frame and thus said boat, said lock means comprising a cylindrical sleeve having a terminal end for frictionally engaging said bearing of said first control arm member driven by a threaded shaft associated with a manually actuable handle;

a transducer mount remotely secured to said control boom, said mount comprising:

a rigid enclosure having a top surface and a lower, open interior;

a float confined within said lower open interior of said enclosure, said float having a hollowed center;

means extending between said second control arm member and said enclosure for flexibly securing the enclosure at the end of said control boom; and,

mounting bracket means for yieldably suspending said transducer within said enclosure at said float center;

lever means mechanically coupled to said transducer via cable means for facilitating pivotal movements of said transducer relative to said enclosure from a position within the boat;

control chain means for manually lifting said control boom out of the water, said chain means extending between a

chain control lever associated with said frame and said vertical offset;

spring suspension means for yieldably maintaining said enclosure in a predetermined, generally stable position relative to said second control arm; and,

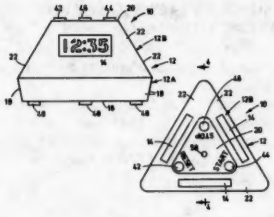
electrical cable means for electrically coupling said transducer to a depth finding apparatus positioned within said boat.

4,888,748

GENERAL PURPOSE DUAL MODE CLOCK AND TIMER UNIT

Lyle E. Lagasse, P.O. Box 7636, Colorado Springs, Colo. 80933, and Dennis D. Andrews, 424 Edgewood Dr., Colorado Springs, Colo. 80907

Filed Nov. 17, 1988, Ser. No. 272,638
Int. Cl.[4] G04F *8/00*; G04B *19/00*
U.S. Cl. 368—107 **30 Claims**



1. A dual mode clock and timer unit, comprising:

(a) a housing having a generally truncated pyramidal shape;

(b) a plurality of displays mounted in angularly displaced relationship from one another on said housing for facilitating the viewing of time-related data from different directions;

(c) a plurality of switches mounted on said housing and being actuatable for selecting one or the other of dual clock and timer operating modes and, after one or the other of said dual modes have been selected, for causing different functions to occur in one of said modes than in the other of said modes; and

(d) circuit means electrically coupled between said switches and each of said displays for concurrently carrying out operations in clock and timer modes and for causing indication of time-related data on said displays relating to one or the other, but not both concurrently, of clock and timer modes in response to selected actuation of said switches.

4,888,749

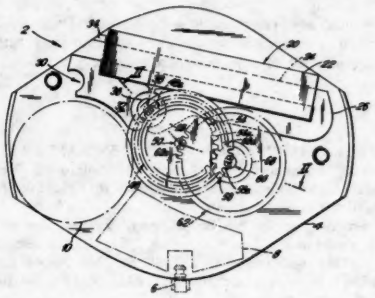
THREE HAND MOVEMENT FOR A TIMEPIECE HAVING A STEPPING MOTOR

Herbert Schwartz, Wurmberg, Fed. Rep. of Germany, and Paul Wuthrich, Watertown, Conn., assignors to Timex Corporation, Middlebury, Conn.

Filed Jan. 30, 1989, Ser. No. 303,413
Int. Cl.[4] G04F *5/00*
U.S. Cl. 368—157 **6 Claims**

1. An improved movement for a three hand quartz analog timepiece having a stationary member, a stepping motor with a rotor pinion adapted to periodically rotate half a revolution, and a plurality of coaxial output members rotatably mounted in said stationary member, said coaxial output members including a seconds spindle adapted to receive a "seconds" hand and having a toothed seconds wheel and a reduction drive pinion connected thereto, said seconds wheel meshing with and driven by said rotor pinion, a minutes sleeve adapted to receive a "minutes" hand and having a toothed minutes wheel connected thereto, and an hours sleeve adapted to receive an "hours" hand and having a toothed hours wheel connected thereto, wherein said improvement comprises;

a dual reduction gear assembly having a single shaft rotatably mounted in said stationary member, said assembly having a toothed third wheel meshing with and driven by



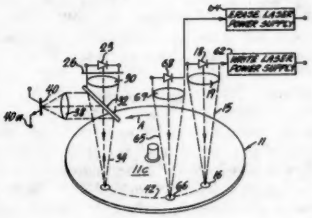
said reduction drive pinion, a first reduction pinion meshing with and driving said hours wheel and a second reduction pinion meshing with and driving said minutes wheel, whereby said reduction drive pinion directly drives both the minutes wheel and the hours wheel through said dual reduction gear assembly.

4,888,750

METHOD AND SYSTEM FOR ERASE BEFORE WRITE MAGNETO-OPTIC RECORDING

Mark H. Kryder, and Han-Ping D. Shieh, both of The Magnetics Technology Center, Carnegie-Mellon University, Hammerschlag Hall, D220, Pittsburgh, Pa. 15213-3890

Continuation-in-part of Ser. No. 33,931, Apr. 3, 1987, abandoned, which is a continuation-in-part of Ser. No. 837,130, Mar. 7, 1986, Pat. No. 4,679,180. This application Nov. 12, 1987, Ser. No. 119,116
Int. Cl.[4] G11B *11/12*
U.S. Cl. 369—13 **13 Claims**



1. A method for over-writing data on a magneto-optic recording medium having a compensation temperature tens of degrees C. above room temperature, comprising the steps of:

(a) erasing any previously recorded magnetic domain in the region on the recording medium to be recorded by temporarily heating the region being erased above the compen-

sation temperature in the absence of any substantial externally provided magnetic bias field to thereby establish a known magnetic state in said recording medium;

(b) receiving data bits to be recorded;

(c) generating a write signal when a data bit and said known state are not the same; and

(d) writing a magnetic domain in said previously erased region only in response to said write signal by temporarily heating an area above the compensation temperature in the absence of any substantial externally provided magnetic bias field.

4,888,751

IMAGE INFORMATION PROCESSING APPARATUS

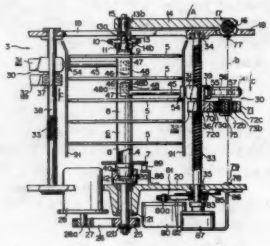
Tomohisa Yoshimaru, Yokohama, and Seinosuke Kajitani, Sagamihara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 85,752, Aug. 17, 1987, abandoned, which is a division of Ser. No. 858,647, May 2, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 240,447

Claims priority, application Japan, May 16, 1985, 60-104403; May 16, 1985, 60-104426

Int. Cl.[4] G11B *7/08, 17/22, 17/30*

U.S. Cl. 369—36 **15 Claims**



10. An image information processing apparatus comprising:

a plurality of optical disks, each having write or read tracks on both surfaces thereof which are spiral patterns winding in directions opposite to each other;

supporting means having a central axis, for supporting said optical disks subjected to read/write access, at predetermined intervals along the central axis thereof;

first driving means for rotating said supporting means in one direction and hence the optical disks about the central axis;

at least one optical unit having an optical head;

rotating means for rotating the optical head through 180 degrees between the adjacent two optical disks so as to allow scanning of the tracks on the facing surfaces of the adjacent optical disks which are rotated in said one direction;

second driving means for moving said optical head along the central axis of said supporting means;

third driving means for moving said optical head in a radial direction of the optical head in a radial direction of the optical disk to selectively bring said optical head into a scanning position where an optical disk can be scanned, and into a non-scanning position where the optical disk cannot be scanned;

control means for controlling said second and third driving means and rotating means to cause said optical head to face a desired position on a desired one of the plurality of optical disks;

said optical unit comprising,

a head arm assembly for supporting said optical head, and

a swinging mechanism for pivotally supporting said head arm assembly for movement in a direction perpendicular to the central axis, said swinging mechanism being able to move along the central axis; and

said second driving means comprising,

a rotating shaft extending parallel to the central axis and having a male screw portion on a surface thereof;

a first motor for rotating said rotating shaft;

a movable member, having a female screw portion threadably engaged with said male screw portion of said rotating shaft, for pivotally supporting said head arm assembly and fixing said swinging mechanism thereon; and

a rotation preventing member for preventing said swinging mechanism for rotating about said rotating shaft.

4,888,752

FOCUSING AND TRACKING SERVO SYSTEM FOR CONTROLLING THE PROJECTION OF AN OPTICAL BEAM ON AN OPTICAL DISK

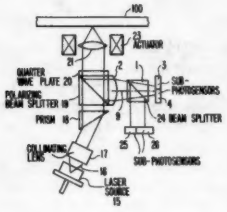
Shigeru Arai, Zushi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 824,276, Jan. 30, 1986, abandoned. This application Jul. 28, 1988, Ser. No. 225,610

Claims priority, application Japan, Jan. 31, 1985, 60-018035

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—44 **11 Claims**



1. An optical focusing servo system for generating a focusing error signal which is utilized to focus an optical beam on a reflective medium, comprising:

photosensor means for generating first and second photoelectric currents I_1 and I_2 in response to an optical beam incident thereon;

means for projecting at least a portion of the optical beam reflected by the reflective medium onto said photosensor means to cause said photosensor means to generate the first and second photoelectric currents, the first photoelectric current being different from the second photoelectric current when the optical beam is projected onto said photosensor means, the optical beam having a first optical axis, said projecting means including a condenser lens having a second optical axis which is offset from the first optical axis by a predetermined distance L;

first and second amplifying means having first and second amplification factors G_1 and G_2, respectively, for amplifying corresponding ones of the first and second photoelectric currents to generate first and second amplified output currents, the first and second amplification factors being selected so that the relation $I_1/I_2=G_2/G_1$ is satisfied when the optical beam is in an in-focus state with respect to the reflective medium; and

means, responsive to the first and second amplified output currents, for generating a focusing error signal corresponding to the difference between the first and second amplified output currents.

4,888,753

INFORMATION RECORDING MEDIUM CAPABLE OF ACCURATELY DETECTING THE RECORDING AND REPRODUCTION STARTING POSITIONS AND AN INFORMATION RECORDING-REPRODUCING METHOD AND APPARATUS THEREFOR

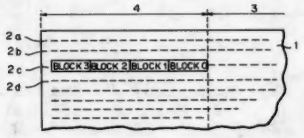
Masahiko Enari, Yokohama; Akio Aoki, Tokyo; Machiko Matsushita, Yokohama; Hiroshi Matsuoka, Kawasaki, and Kazuo Minoura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1986, Ser. No. 870,528

Claims priority, application Japan, Jun. 5, 1985, 60-122186; Oct. 18, 1985, 60-231386

Int. Cl.[4] G11B 7/00

U.S. Cl. 369—44 26 Claims



1. An information recording medium having a plurality of information tracks, each of said information tracks has a recording area for recording information thereon, and a plurality of sets of information, each set including a discrimination mark for discriminating one information track from the other information tracks and contiguously provided in such a manner that said sets of information are in contact with each other, and said plurality of sets of information each further include position information indicative of recording starting position, said position information of each of said plurality of sets of information being different from each other according to their positional relationships with the recording starting position.

4,888,754

ARRANGEMENT FOR REPRODUCING DATA READABLE BY AN OPTICAL SCANNER FROM TRACKS OF A RECORDED MEDIUM

Günter Gleim, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany

Filed Apr. 29, 1988, Ser. No. 188,459

Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715491

Int. Cl.[4] G11B 7/00

U.S. Cl. 369—44 3 Claims

1. An arrangement for reproducing data readable by an optical scanner from tracks on a recorded medium, comprising:

focus control means for focusing at least one beam of light on the medium tracking control means for positioning said beam of light along said tracks; a photodetector for receiving said beam after being reflected by said medium; said photodetector generating an electrical data signal with a phase relation, a focusing error signal with a phase relation for indicating the current state of said focus control means, and a tracking error signal indicating the current state of said tracking control means; control amplifier means in said focus control means and having an offset voltage and an input; a source of offset compensation voltage connected to said input of said control amplifier for compensating said offset voltage of said control amplifier; and means for varying said offset compensation voltage at said input of said control amplifier until the phase relation of said focusing error signal coincides with the phase relation of said data signal for obtaining a correct value for said offset compensation voltage, said offset compensation voltage having a correct value when the two phase relations coincide.

4,888,755

OPTICAL HEAD FOR RECORDING INFORMATIONS INTO A RECORD MEDIUM AND REPRODUCING THE SAME THEREFROM

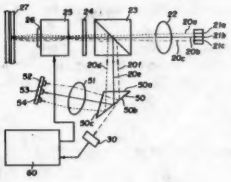
Masataka Itoh, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,083

Claims priority, application Japan, Jul. 2, 1986, 61-156403

Int. Cl.[4] G11B 7/135

U.S. Cl. 369—45 6 Claims



1. An optical head for recording informations into a record medium and reproducing the same therefrom comprising,

a plurality of light sources from which a plurality of light beams are emitted,

means for focusing said plurality of light beams on a record medium,

means for deflecting said plurality of light beams reflected from said record medium in a predetermined direction, each light axis thereof having a slight slant to others,

means positioned in said predetermined direction for separating said plurality of light beams deflected by said means for deflecting to partially pass at least one of said plurality of light beams therethrough and to reflect the remaining portion of said at least one of said plurality of light beams and the others of said plurality of light beams,

means for detecting said portion of said at least one of said plurality of light beams which passes through said means for separating, and

means for controlling said means for focusing to correct focusing or tracking error in accordance with signals produced in said means for detecting.

4,888,756

OPTICAL INFORMATION RECORDING AND REPRODUCING APPARATUS

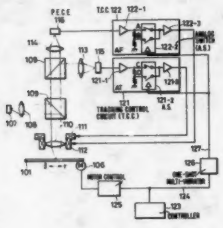
Satoshi Shikichi, Tokyo, and Hideki Hosoya, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 49,567, May 14, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 291,368

Claims priority, application Japan, May 20, 1986, 61-113511; May 20, 1986, 61-113512

Int. Cl.[4] G11B 7/00

U.S. Cl. 369—45 38 Claims



1. An optical information recording and reproducing apparatus for an optical record medium on which a plurality of tracks are arranged substantially in parallel, comprising:

a light source for providing a light beam;

first optical means for guiding the light beam from said light source onto the record medium;

second optical means for acting on the light beam from the record medium;

detecting means for receiving the light beam acted on by said second optical means for output at least one of a focussing signal and a tracking signal;

adjusting means for adjusting at least one of focussing and tracking operations in accordance with at least one of the focussing and tracking signals;

reciprocating means for providing relative reciprocatory motion between the record medium and the light beam;

control means for controlling the reciprocating means; and

switching means for switching at least a servo gain of said adjusting means from a first value to a second value in accordance with at least a signal from said control means.

4,888,757

FOCUSED-SPOT-POSITION DETECTION DEVICE FOR OPTICAL INFORMATION RECORDING AND REPRODUCING DEVICE

Teruo Fujita, Kyoto, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP87/00632, § 371 Date Apr. 22, 1988, § 102(e) Date Apr. 22, 1988, PCT Pub. No. WO88/01784, PCT Pub. Date Mar. 10, 1988

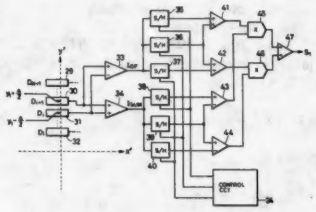
PCT Filed Aug. 26, 1987, Ser. No. 196,190

Claims priority, application Japan, Aug. 29, 1986, 61-204261

Int. Cl.[4] G11B 7/09

U.S. Cl. 369—46 10 Claims

1. In a focused-spot-position detecting device for an optical information recording and reproducing device including light source means, focusing means for focusing light beam from said light source means onto an information recording medium having information tracks, light beam separating means for separating reflected light beam from said information recording medium from said light beam from said light source, an optical sensor for converting said reflected light beam into an electric signal and a control signal generator responsive to an output signal of said optical sensor for producing a control signal for correcting a focus point of said focusing means and correcting a tracking, an improvement characterized by said light source means comprising a plurality of light sources capable of being on-off controlled by a control circuit and arranged such that focus points of light beams of said light sources are juxtaposed vertically with respect to said information tracks on said information recording medium, said optical sensor comprising at least two optical sensor elements having light receiving region having major length in parallel with said information tracks, said optical sensor elements being arranged



in a far field from said information recording medium, further comprising an operation circuit for sampling and holding a differential output signal and a sum output signal of said optical sensor elements in synchronism with the on-off energizations of said light sources and operating the sample-hold outputs to obtain a focusing error signal.

4,888,758

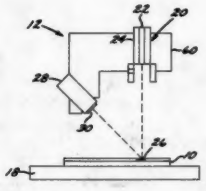
DATA STORAGE USING AMORPHOUS METALLIC STORAGE MEDIUM

David M. Scruggs, Tradewind Ct., San Jan Capistrano, Calif. 92675, and John M. Zabsky, 3640C S. Main St., Santa Ana, Calif. 92707

Filed Nov. 23, 1987, Ser. No. 123,924

Int. Cl.[4] G11B 7/24, 7/00

U.S. Cl. 369—101 20 Claims



1. An information storage system, comprising:

a memory medium, including a substrate and a layer of an amorphously transformable metal upon said substrate;

means for transforming discrete regions of said layer from the crystalline to the amorphous state, and for transforming discrete regions of said layer from the amorphous to the crystalline state;

means for controlling the pattern of the transformed regions to store information therein; and

means for sensing whether a discrete region of said layer is amorphous or crystalline, said means for sensing including a detector for detecting radiation emitted from the interior volume of the discrete region.

4,888,759
LASER OPTICAL MEMORY SYSTEM HAVING BEAM COMBINING AND SEPARATING APPARATUS FOR COMBINING AND SEPARATING READING AND WRITING LASER BEAMS

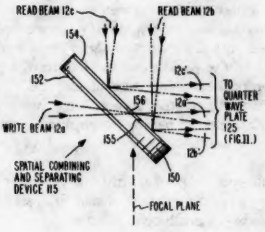
Robert L. Hazel, Thousand Oaks, and Gilbert Y. H. Chan, Agoura, both of Calif., assignors to Burroughs Corporation, Arlington, Va.

Filed Sep. 9, 1982, Ser. No. 416,417

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—110 **17 Claims**



1. In an optical storage system including an optical storage medium, the combination comprising:

first means for providing a writing radiation beam for producing optically detectable changes in said medium;

second means for providing a reading radiation beam for reading said optically detectable changes as a result of changes produced in the reading beam after reflection from said medium;

optical detection means for detecting changes in a reflected beam applied thereto; and

third means to which said beams are applied for combining said recording and reading beams, focusing the combined beams onto predetermined areas of said medium, separating the reflected beams after reflection from said medium, and directing the separated reflected reading beam to said optical detection means;

said third means including a polarization-insensitive spatial combining and separating device constructed, arranged and located with respect to said beams so that the original writing beam and the reflected writing beam from said medium each pass through said device without being changed in direction, while the original reading beam and the reflected reading beam from said medium are each reflected by said device and changed in direction after being reflected by said device.

4,888,760
OPTICAL HEAD APPARATUS

Shinsuke Shikama; Eiichi Toide; Mitsushige Kondou, all of Nagaokakyo, and Kazuo Iwata, Gunma, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

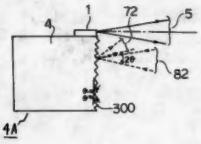
Continuation of Ser. No. 883,872, Jul. 9, 1986, abandoned. This application Feb. 12, 1988, Ser. No. 159,412

Claims priority, application Japan, Jul. 29, 1985, 60-167010; Jul. 29, 1985, 60-167011

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—122 **4 Claims**

1. In an optical head apparatus having a light source mounted on a base element in a manner that a light emitting end face of said light source is made flush with a front end face of said base element; optical incident means for diffracting a light beam emitted from said light source into a plurality of diffracted light beams and for focusing said diffracted light beams to a plurality of spot lights on a data storage media; splitter means interposed in said optical incident means for separating light beams coming from the side of said light source from reflected light beams coming from said data storage media; and photodetection means constructed of a plurality of photoreceptors for receiving light beams having been separated by said splitter means, the improvement comprising wherein a light beam treating means is provided adjacent said light source for preventing a reflecting of re-incident light beams from said optical incident means back to said optical



incident means, said light beam treating means being provided on at least a portion of said base element, on which portion re-incident light beams not having been separated by said splitter means would normally become incident again, and wherein said light beam treating means includes means defining a serrated surface formed in said front end face of said base element.

4,888,761
DISK CARTRIDGE

Teruo Ohta, Miyagi, Japan, assignor to Sony Corporation, Tokyo, Japan

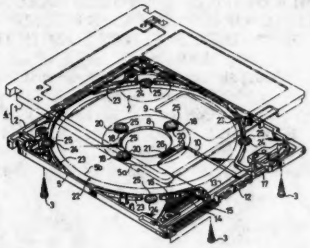
PCT No. PCT/JP87/00470, § 371 Date Feb. 25, 1988, § 102(e) Date Feb. 25, 1988, PCT Pub. No. WO88/00385, PCT Pub. Date Jan. 14, 1988

PCT Filed Jul. 3, 1987, Ser. No. 172,543

Claims priority, application Japan, Jul. 4, 1986, 61-102707; Sep. 16, 1986, 61-217531

Int. Cl.[4] G11B *23/03*

U.S. Cl. 369—291 **9 Claims**



1. A disk cartridge in which a recording and reproducing disk is accommodated to be rotatable comprising:

a pair of cartridge halves having concave supporting portions formed on their inner surfaces at positions aligned with non-signal recorded positions on the inner and outer peripheries of said disk; and

disk supporting members mounted in said concave supporting portions, said supporting members being provided with disk supporting surfaces, each such disk supporting surface having a disk sticking preventing portion, said supporting members supporting said disk when said disk is not in use and wherein said supporting members are sized in relation to the dimensions of the concave supporting portions so that they slightly project from said concave supporting portions and said supporting members are provided on their sides opposite to their disk supporting

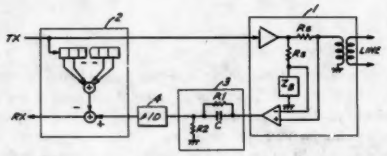
surfaces with concave portions and an adhesive agent is deposited into said concave portions to thereby fix said supporting members to said supporting portions.

4,888,762

ECHO CANCELLER FOR BIDIRECTIONAL TRANSMISSION ON TWO-WIRE SUBSCRIBER LINES

Masanobu Arai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 17, 1988, Ser. No. 156,711
Claims priority, application Japan, Feb. 17, 1987, 62-34800
Int. Cl.[4] H04B 3/23
U.S. Cl. 370—32.1 9 Claims



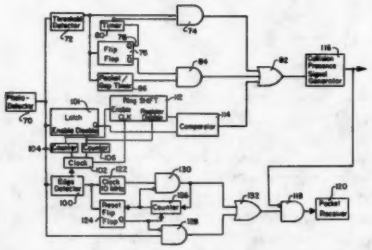
1. An echo canceller comprising:
a transformer for connecting to a two-wire subscriber line;
a hybrid circuit having a four-wire side and coupling its four-wire side to said two-wire subscriber line via said transformer;
an echo canceller circuit connected to said hybrid circuit for cancelling an echo signal; and
an echo path filter connected between said hybrid circuit and said echo canceller circuit and having a zero point for cancelling a pole of an echo path transfer function attributable to an inductance component of said transformer.

4,888,763

METHOD AND APPARATUS FOR DETECTING THE COLLISION OF DATA PACKETS UTILIZING A PREASSIGNED TRANSCEIVER CODE IN THE PREAMBLE

Walter B. Hatfield, Fair Haven, N.J.; Nathan Tobol, Wrentham, Mass., and Frederick W. Scholl, Riverdale, N.Y., assignors to Codenoll Technology Corporation, Yonkers, N.Y.

Filed Mar. 11, 1988, Ser. No. 167,074
Int. Cl.[4] H04J 3/26
U.S. Cl. 370—85.2 15 Claims



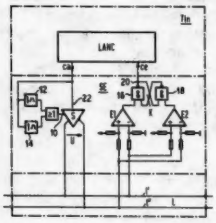
1. In a communication network, a method for detecting collisions of varying overlap among packets of binary data transmitted over said network comprising:
(a) generating in each binary data signal packet that is transmitted over the network a collision signal comprising:
(i) a large initial pulse having an amplitude greater than that of a high binary data signal level and a pulse width greater than the pulse width of a binary data signal; and
(ii) a transceiver code unique to each transceiver device from which a binary data signal packet is transmitted;
(b) at at least one location, monitoring the network throughout a transmission session during which data packets are transmitted to detect collisions between data signal packets transmitted from different transmitters;
(c) producing a first error signal if a signal detected on the network includes a large pulse having a pulse width greater than the pulse width of the generated initial pulse;
(d) producing a second error signal if a signal detected on the network includes a transceiver code which is not equal to the transceiver code in a signal packet that is transmitted from a first transceiver device;
(e) producing a third error signal if a subsequent large pulse is detected on the network within a time period equal to the length of the packet and the length of a gap between successive packets being transmitted; and
(f) if a collision is detected, transmitting over the network a collision detect pulse having an amplitude and pulse width similar to the amplitude and pulse width of the large initial pulse;
wherein collisions of packets of binary data are detected if any one or any combination of said first, second and third error signals are produced.

4,888,764

TRANSMISSION-RECEPTION EQUIPMENT FOR A BUS SYSTEM

Friedrich Haug, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 11, 1987, Ser. No. 131,802
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1986, 3642382
Int. Cl.[4] H04J 3/02
U.S. Cl. 370—85.1 11 Claims

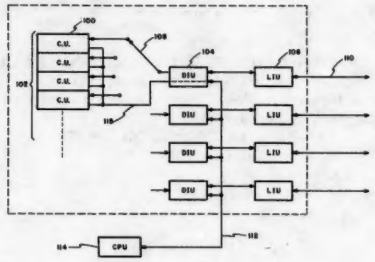


1. Transmission-reception equipment for a bus system having two signal conductors, having a difference bus transmission side coupled to said signal conductors via two difference outputs thereof, and having a difference bus reception side connected to the signal conductors via two difference inputs thereof, comprising at least one difference bus transmitter, respectively unlocked only for a fraction of a bit time span after every level transition of transmission data supplied to the bus transmitter and thereby outputting a positive or negative difference voltage pulse dependent on a signal level of the transmission data, provided at the transmission side, this at least one difference bus transmitter being in a quiescent condition of high internal resistance during the remaining part of every bit time span; and two difference bus receivers each having at least positive and negative inputs connected to the signal conductors oppositely relative to the polarity of their inputs, and a bi-stable RS flip-flop having its two inputs connected to outputs of the two difference bus receivers on the reception side.

4,888,765
DIGITAL LOOP CARRIER SYSTEM HAVING PROGRAMMABLE TIMESLOT AND BANDWIDTH ALLOCATION CIRCUIT

Harry J. Dyke, Oak Forest, Ill., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 22, 1988, Ser. No. 234,972
Int. Cl.[4] H04J *3/16*
U.S. Cl. 370—95.1 **15 Claims**



1. A system for selectively allocating individual ones of a plurality of channel units to transmit and receive data on a transmission line during a plurality of timeslots of a pulse code modulation serial signal transmitted on a time division multiplexing basis, comprising:

means for providing a plurality of timeslot binary addresses respectively corresponding to said plurality of timeslots, each of said timeslot binary addresses being provided the timeslot corresponding thereto on a plurality of timeslot address output lines of a register;

a bus for connecting all said plurality of channel units to said timeslot binary address providing means;

means for assigning a plurality of channel unit binary addresses to said plurality of channel units which respectively correspond to said plurality of timeslots and to the plurality of timeslot binary addresses corresponding thereto, said channel unit binary addresses being assigned on a relatively permanent basis on a plurality of channel unit binary address output lines of another register; and

means associated with each of said channel units including means for comparing each of said timeslot binary addresses with said channel unit binary address assigned thereto, said comparing means being responsive to a correspondence between said timeslot binary address and said assigned channel unit binary address by said comparing means to enable transmitting and receiving by said channel unit on said transmission line.

4,888,766
MULTI-TERMINAL CONTROL SYSTEM

Fumihiro Ogasawara, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,600
Claims priority, application Japan, May 13, 1987, 62-114819
Int. Cl.[4] H04J *3/12*
U.S. Cl. 370—95.1 **3 Claims**

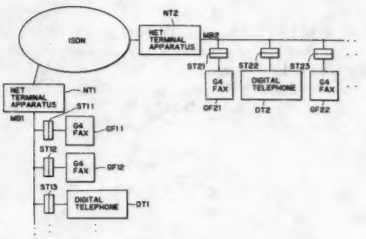
1. A method of controlling a plurality of data terminal apparatuses connected to a bus type communication path in which a signal channel shared by said plurality of data terminal apparatuses for call connection with a network and at least one information channel are multiplexed, comprising the steps of:

a calling data terminal apparatus obtaining an access right to a signal channel;

requesting through the signal channel to a bus type communication path the establishment of a connection to a destination data terminal apparatus using an information channel;

alloting an empty information channel to the calling data terminal apparatus if one is empty;

sending a disconnection message to the calling data terminal apparatus if there is no empty information channel;



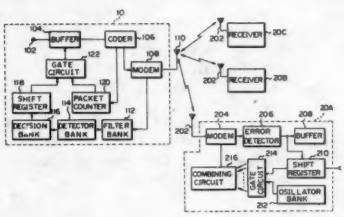
disconnecting the information channel connection and switching the signal channel to an information channel after the calling data terminal apparatus has received the disconnection message;

acknowledging the signal channel as an information channel and transmitting the information by the bus type communication path to the destination.

4,888,767
REPEAT REQUEST SIGNAL TRANSMISSION METHOD FOR MULTI-STATION PACKET COMMUNICATION

Yukitsuna Furuya, and Fumio Akashi, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Continuation of Ser. No. 812,979, Dec. 24, 1985, abandoned.
This application Jul. 7, 1988, Ser. No. 217,090
Claims priority, application Japan, Dec. 25, 1984, 59-278053; Dec. 26, 1984, 59-277293; Mar. 22, 1985, 60-56052
Int. Cl.[4] H04J *3/16*
U.S. Cl. 370—95.2 **7 Claims**



1. A repeat request signal transmitting method for use in a multi-station packet communication system, in which a same message is transmitted in packet form from a single transmitting station to each of a plurality of receive stations in a multi-access environment, said method comprising the steps of:

at each receive station, checking received packets for errors and sending back to the transmitting station repeat request signals, each repeat request signal comprising a frequency component which is determined at the receive station in response to packets found to be erroneous, the frequency of said components being based on a predetermined rule followed in the receive station and recognized in a transmitting station; and

at a transmitting station, sensing said respective frequency component of the said repeat request signal that is sent back from the receive station, comparing the energy level of the repeat request signal that is sent back from the

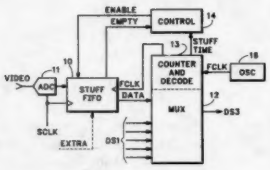
receive station with a predetermined energy value, each of said frequency components being sensed to require a packet to be retransmitted if the received energy level is greater than said predetermined value, and determining which packets are to be retransmitted in the response to the received frequency components based on the said predetermined rule.

4,888,768

FRAME FORMAT FOR VIDEO CODEC

James A. Michener, Grass Valley, Calif., assignor to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Jul. 6, 1987, Ser. No. 69,682
Int. Cl.[4] H04J 3/22
U.S. Cl. 370—102 **10 Claims**



1. A video coder comprising:

means for storing digital data at a first data rate and for reading out the digital data at a second data rate, the first and second data rates being asynchronous with respect to each other;

means for coding a stuff word for addition to the storing means at a third data rate synchronous with the second data rate, the stuff word containing a valid digital data bit from the digital data when necessary to compensate for the rate differential between the first and second data rates; and

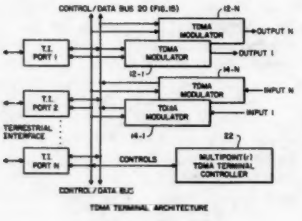
means for multiplexing the digital data and the stuff word from the storing means with a plurality of other data channels having fourth data rates, the combination of the digital data, the stuff word and other data channels being in the form of a master digital data frame having a data rate equal to the second data rate.

4,888,769

TDMA TERMINAL CONTROLLER

Joseph H. Deal, Santa Clara County, Calif., assignor to TIW Systems, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 73,847, Jul. 13, 1987, abandoned, which is a continuation of Ser. No. 805,616, Dec. 6, 1985, abandoned. This application Jan. 18, 1989, Ser. No. 298,829
Int. Cl.[4] H04B 7/185
U.S. Cl. 370—50 **15 Claims**



1. A time division multiple access (TDMA) terminal comprising a plurality of terrestrial interface ports, a plurality of TDMA modulators and demodulators for modulating preamble and port data on a carrier and demodulating data from the carrier, the interface ports and the modulators and demodulators being fully interconnected over a common bus arrangement,

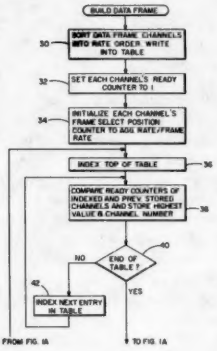
a TDMA terminal controller comprising means for sequencing the flow of said data to said modulators and demodulators over said common bus, and said sequencing means comprising means during each time frame for transmitting null addresses to said ports, disabling bus access to the interface ports and transmit/receive units included therein.

4,888,770

ALGORITHM FOR SELECTING CHANNELS FOR MULTIPLEXER FRAME

Kuldip S. Bains, Watertown, Conn., assignor to General Data-Comm, Inc., Middlebury, Conn.

Filed Oct. 19, 1988, Ser. No. 259,856
Int. Cl.[4] H04J 3/12
U.S. Cl. 370—110.1 **11 Claims**



1. A method for ordering selects for a plurality of channels into a multiplexer frame, comprising:

(a) providing a channel ready counter and a channel select position counter for each of said plurality of channels;

(b) initializing said channel ready counters;

(c) initializing said channel select position counters to a value corresponding to the total number of selects in said frame;

(d) choosing a select of a channel at least based on respective values of the channel ready counters of said channels, wherein a channel having a ready counter value indicative of relative greater excursion is always chosen over a channel having a ready counter value indicative of relative lesser excursion;

(e) changing the position counter of each channel by a value corresponding to the number of selects in said frame for that channel;

(f) changing the position counter of a channel by said value corresponding to the total number of selects in said frame when said position counter for that channel reaches or passes through a predetermined value threshold;

(g) changing the value of said channel ready counter to indicate greater excursion when said channel position counter for that channel reaches or passes through said predetermined value threshold;

(h) changing the value of the channel ready counter to indicate less excursion of said channel selected at step (d); and

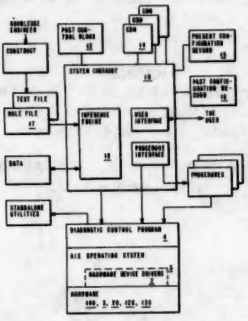
(i) repeating steps (d)–(h) until said frame is substantially filled with selects.

4,888,771

DIAGNOSTIC CONFIGURATION MANAGEMENT FOR A DATA PROCESSING SYSTEM

Douglas M. Benignus, Dime Box, and Luke M. Browning, Austin, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 23, 1988, Ser. No. 210,587
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—16.1 24 Claims



6. A system for running diagnostics on a processing system having a plurality of attachable options, said system comprising:

a configuration list having an entry for each of said options in a present configuration of said processing system;

means for identifying, in said configuration list, a hierarchy of dependent options in said present configuration; and

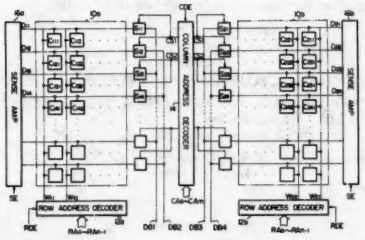
means for accessing said identified hierarchy for determining an order in checking at least one option antecedent to a selected option during a checkout of said selected option.

4,888,772

TESTING CIRCUIT FOR RANDOM ACCESS MEMORY DEVICE

Takaho Tanigawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 25, 1987, Ser. No. 66,275
Claims priority, application Japan, Jun. 25, 1986, 61-150347
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—21.2 8 Claims



1. A semiconductor memory device comprising:

(a) a memory cell array consisting of a number of memory cells arranged in rows and columns,

(b) at least two data bus lines operatively connected to said memory cell array,

(c) first selector means responsive to a portion of a supplied address signal for selecting at least two of the memory cells from said memory cell array and coupling the selected at least two memory cells respectively to said at least two data bus lines,

(d) second selector means connected to said at least two data bus lines and to a data input terminal to receive supplied input data, the second selector means being responsive to the remaining portion of the supplied address signal for selecting one of said at least two data bus lines and supplying to the selected single data bus line the data to be written into the memory cell which is selected from the selected at least two memory cell and which is connected to the selected single data bus line, and

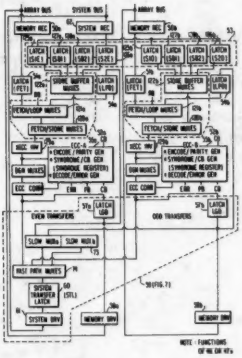
(e) a memory testing circuit connected to said at least two data bus lines and said data input terminal and responsive to the data supplied through said data input terminal to supply test data to each of said at least two selected data bus lines for writing the test data concurrently into said at least two selected memory cells of said memory cell array without relying on said second selector means.

4,888,773

SMART MEMORY CARD ARCHITECTURE AND INTERFACE

David L. Arlington, Chittenden County, Vt.; Jacqueline M. Cole, Broome County, N.Y.; Bruce G. Hazelzet; David J. Krolak, both of Crittenden County, Vt.; Hehching H. Li, Tioga County; Bharat J. Oza, Broome County, both of N.Y., and A. Frank Weaver, Chittenden County, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 15, 1988, Ser. No. 206,757
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—40.2 11 Claims



1. An improved smart memory card architecture of the type including a memory array communicating with a system bus via on-card logic, said on-card logic comprising:

first latch means connected to receive data from said memory array for temporarily storing said data;

error correction code means connected to receive data from said first latch means for performing error detection and correction on said data;

second latch means connected to receive data from said error correction code means for temporarily storing said data; and

data output select means connected to receive data from said error correction code means and said second latch means for selectively transmitting data to said system bus;

wherein said first latch means, said error correction code means and said second latch means each comprise odd and even parts, said data output select means being connected to receive data from both odd and even parts of said error correction code means and said second latch means, said on-card logic further comprising control means for con-

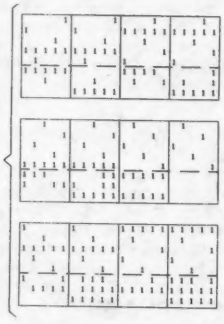
trolling said data select means to interleave data from said odd and even parts.

4,888,774

ERROR DETECTION SYSTEM

Hiroshi Kosuge, and Yoshio Kiriu, both of Kanagawa, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 15, 1987, Ser. No. 132,993
Claims priority, application Japan, Dec. 18, 1986, 61-302226
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—38.1 **26 Claims**



1. An error detection apparatus comprising:

means for generating information which has a plurality of bits;

means for obtaining a syndrome from the information bits by using a parity matrix containing at least one of the following b×b partial parity matrices Ao to Ab where b is the number of bits in a block of the information bits; and

where Ai (i=0∼b) is a b×b matrix with Ai=B-Ci and Ci(i=0∼b) is a b×b martix obtained by multiplying a b×b matrix i times by C, that is:

$$C = \begin{array}{|cccccc|c|} \hline 1 & 1 & 1 & \cdots & 1 & 1 & 1 \\ 1 & & & & & & 2 \\ & 1 & & & & & 3 \\ & & 1 & & & & 4 \\ & & & \ddots & & & \vdots \\ & & & & 1 & & b-1 \\ & & & & & 1 & b \\ \hline \multicolumn{6}{|c|}{1\ 2\ 3\ \cdots\ b-1\ b} & \\ \hline \end{array}$$

B is a b×b matrix obtained by arbitrarily replacing the rows and columns of Ci.

4,888,775

TRELLIS CODES FOR PARTIAL RESPONSE CHANNELS

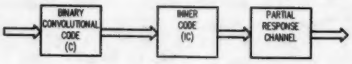
Razmik Karabed, and Paul H. Siegel, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 18, 1988, Ser. No. 169,919
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—43 **15 Claims**

1. A method for coding input strings to improve reliability of partial response channels, comprising the steps of:

(a) encoding an input string into an intermediate string using a binary convolution code; and

(b) encoding said intermediate string using a nonlinear inner code that repeats and inverts selected bits of said interme-



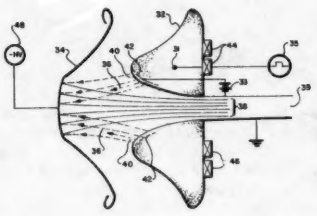
diate string; said inner code having a coding rate of less than one.

4,888,776

RIBBON BEAM FREE ELECTRON LASER

Franklin A. Dolezal, Reseda, and Robin J. Harvey, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 13, 1988, Ser. No. 283,663
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—2 **35 Claims**



1. A free electron laser, comprising:

an electron gun for generating an electron beam having a cathode and an anode;

a waveguide cavity resonator section having an input end and an output end through which the electron beam passes;

a phase priming array means coupled to said waveguide cavity section for accepting an input control signal and for outputting a priming signal having a preselected phase to said waveguide cavity section;

wiggler means for varying the trajectory of electrons in the electron beam while the electrons pass through the waveguide cavity section at a frequency determined by the spacing of magnets in the wiggler means, the electrons emitting radiation; and

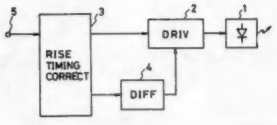
output means for outputting the emitted radiation.

4,888,777

SEMICONDUCTOR LASER CONTROL APPARATUS

Yoshinobu Takeyama, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,427
Claims priority, application Japan, Feb. 10, 1988, 63-29539
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—38 **11 Claims**



1. A semiconductor laser control apparatus for controlling

an optical output of a semiconductor laser, said semiconductor laser control apparatus comprising:

terminal means for receiving a modulation signal which determines ON and OFF states of the semiconductor laser;

correcting means supplied with the modulation signal from said terminal means for outputting a processed modulation signal; and

driving means supplied with the processed modulation signal from said correcting means for supplying a driving signal to the semiconductor laser,

said correcting means including differentiating means responsive to the processed modulation signal for supplying a correction signal having a predetermined time constant to said driving means when the semiconductor laser is ON so as to maintain the optical output of the semiconductor laser constant, and pulse width correcting means for correcting a pulse width of the modulation signal to obtain the processed modulation signal, said processed modulation signal being supplied to said driving means so that the semiconductor laser is ON and operates until a time which is delayed by a predetermined delay time from an operation end time determined by the modulation signal received at said terminal means.

4,888,778

ALGEBRAIC CODER-DECODER FOR REED SOLOMON AND BCH BLOCK CODES, APPLICABLE TO TELECOMMUNICATIONS

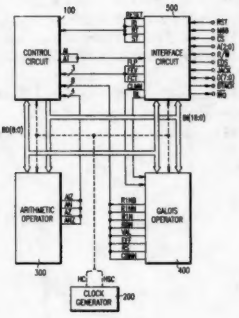
Dominique Brechard, Paris, and Pierre-Andre Laurent, Bessancourt, both of France, assignors to Thomson-CSF, Paris, France

Filed Oct. 27, 1987, Ser. No. 112,954

Claims priority, application France, Oct. 27, 1986, 86 14925

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—37.4 **4 Claims**



1. An algebraic Reed Solomon and BCH block code coder-decoder comprising:

a processor means;

a clock generator coupled to said processor means;

an arithmetic operator means coupled to said processor means;

a Galois operator coupled to said processor means for processing values in Galois bodies having

a computation means having two inputs;

two independent addressable memories of matched capacities coupled to the inputs of said computation means;

an indirect memory access means operatively associated with said Galois operator for controlling access to said two memories;

an operator circuit control means organized on three levels, the first level being for the selection of data sources, the second for the storage of three operands X, Y and Z;

and the third for computation of X+(YxZ) from said stored operands and for executing block code coding and decoding algorithms;

a control and interface circuit contained as part of said processor means and having I/O access and connected to a data bus for controlling access to said I/O and for executing a sequence of operations including initialization of said access and polynomial computations;

wherein said two independent memories coupled to computation means are used as FIFO memories for said control and interface circuit on a cycle stealing arrangement.

4,888,779

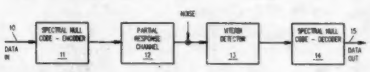
MATCHED SPECTRAL NULL TRELLIS CODES FOR PARTIAL RESPONSE CHANNELS

Razmik Karabed, and Paul H. Siegel, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 18, 1988, Ser. No. 169,920

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—43 **13 Claims**



10. A method for coding an input string for a partial response channel having a transfer function to provide an output having a preselectable coding rate and a reliability determined by a preselectable coding gain, comprising the steps of:

(a) determining each frequency at which there is a zero in the transfer function of the partial response channel;

(b) concurrently determining how many consecutive derivatives of the transfer functions which zero at each of said frequencies; and

(c) encoding an input string into a code string having a power spectrum value of zero for each such frequency and with a number of consecutive derivatives of the power spectrum which are zero, the last-mentioned number being determined by the coding gain preselected.

4,888,780

METHOD OF DETECTING AND CORRECTING AN ERROR THAT HAS OCCURRED IN A DIGITAL COMPUTER

Ryuzo Imazu, Suita, Japan, assignor to Fuji Sangyo Co., Ltd., Osaka, Japan

Filed Dec. 10, 1987, Ser. No. 131,063

Claims priority, application Japan, Jan. 7, 1987, 62-1492

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—31 **2 Claims**

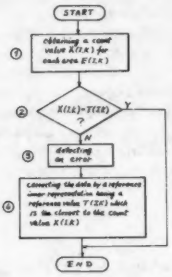
1. A method for detecting and correcting an error that has occurred in a digital computer comprising the steps of:

counting the number of mark bits in each predetermined area of each of the component units constituting data, each of said component units being capable of being represented by one of a predetermined number of reference representations that correspond to valid states of the component unit;

detecting the occurrence of an error in said area when said number of mark bits is not identical to the number of mark bits in the corresponding areas of any of said reference representations; and

correcting said component units in which the error has been

detected by substituting therefor that one of said reference representations that has the number of mark bits in the



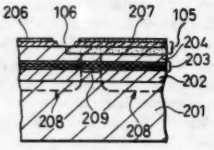
corresponding area which is the closest to the number of mark bits in said area in which the error has been detected.

4,888,781

SEMICONDUCTOR LASER

Etsuji Omura; Katsuhiko Goto; Shogo Takahashi; Harumi Namba, and Akira Takemoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,806
Claims priority, application Japan, Feb. 2, 1988, 63-23554
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—46 **6 Claims**



1. A buried heterojunction semiconductor laser comprising:
(a) a quantum well active layer;
(b) upper and lower cladding layers confining said active layer;
(c) diffused regions of a first conductivity type in the upper cladding layer, said diffused regions extending into the active layer to define in the active layer disordered regions and a nondisordered central stripe;
(d) second conductivity type surface regions of said upper cladding layer partially extending over said diffused regions and in electrical contact with the upper cladding layer located above said nondisordered central stripe; and
(e) a pair of electrodes on the upper cladding layer, one electrode being in electrical contact with the first and the other in contact with the second conductivity type regions of the upper cladding layer.

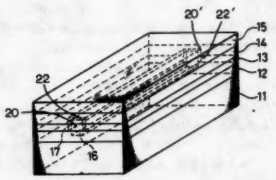
4,888,782

SEMICONDUCTOR LIGHT EMITTING DEVICE

Syoichi Kakimoto, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Osaka, Japan

Filed Jul. 8, 1988, Ser. No. 216,832
Claims priority, application Japan, Jul. 16, 1987, 62-179346
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—46 **8 Claims**

1. A buried strip semiconductor light emitting device comprising, in combination:
a doped semiconductor substrate;
a doped first cladding layer grown on said semiconductor substrate;
a doped stripe introduced directly into the first cladding layer internal to the semiconductor light emitting device and of a conductivity type opposite that of the first cladding layer, the doped stripe comprising a source of impurities for out-diffusion to the active layer;
an active layer interposed directly over said first cladding layer and completely covering the doped stripe;



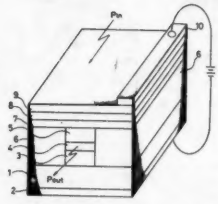
a second cladding layer grown on said active layer;
a contact layer grown on said second cladding layer; and
a region of impurities in the active layer out-diffused from the doped stripe in the adjacent first cladding layer, the region of out-diffused impurities extending to the boundary between the active layer and second cladding layer to form a resonator internal to the semiconductor light-emitting device.

4,888,783

SEMICONDUCTOR LASER DEVICE

Keisuke Kojima; Kazuo Kyuma; Susumu Noda; Masaaki Kameya; Jun Ohta, and Koichi Hammanaka, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 17, 1988, Ser. No. 169,472
Claims priority, application Japan, Mar. 20, 1987, 62-66249; May 12, 1987, 62-115282; Aug. 27, 1987, 62-213959
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—44 **19 Claims**



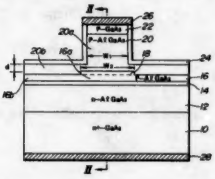
1. A light-responsive semiconductor device in which a laser oscillation state is controlled by incident light, said device comprising a semiconductor laser structure including, serially disposed, a first electrode, a first conductivity type semiconductor substrate, a first conductivity type semiconductor first cladding layer, an active semiconductor layer, a second conductivity type semiconductor second cladding layer, a layer of material having a conductivity modulatable by light, and a second electrode transparent to light that modulates said layer, said layer responding to incident light to control the oscillation state of said laser.

4,888,784

SEMICONDUCTOR LASER DEVICE

Shoji Hirata, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 18, 1988, Ser. No. 182,492
Claims priority, application Japan, Apr. 23, 1987, 62-100763
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—46 34 Claims



1. In a semiconductor laser device:

a semiconductor substrate of a first conductivity type having a major surface;

a first semiconductor layer of said first conductivity type disposed on said major surface of said semiconductor substrate;

a laser active layer disposed on said first semiconductor layer on the side opposite from said semiconductor substrate;

a second semiconductor layer of the second conductivity type disposed on said laser active layer on the side opposite from said first semiconductor layer, said second semiconductor layer having a strip waveguide structure with a first width for obtaining optical confinement, said strip waveguide structure projecting from the second semiconductor layer on the side thereof opposite from said laser active layer and extending along the central area of said second semiconductor layer in a longitudinal direction;

a third semiconductor layer of said second conductivity type disposed on said strip waveguide structure and second semiconductor layer on the side thereof opposite from said laser active layer, said third semiconductor layer having a ridged waveguide structure for defining an electrical current passage region, said ridged structure projecting from said third semiconductor layer on the opposite side from said second semiconductor layer and extending in said longitudinal direction with a second width corresponding to said strip structure, said third semiconductor layer having a plate portion and a rigid portion and has a T-shaped cross-sectional shape;

a fourth semiconductor layer of said second conductivity type disposed on said ridge waveguide structure; and

a pair of electrodes for supplying bias voltage, one of said electrodes being connected to said semiconductor substrate and the other electrode being connected to said further semiconductor layer.

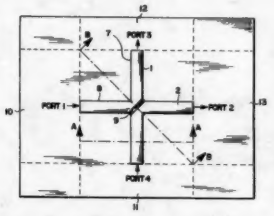
4,888,785

MINIATURE INTEGRATED OPTICAL BEAM SPLITTER

Tien-Pei Lee, Holmdel, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Jan. 19, 1988, Ser. No. 146,217
Int. Cl.[4] H01S 3/19; G02B 6/10
U.S. Cl. 372—50 4 Claims

1. A monolithic semiconductor device comprising a ridge waveguide beam splitter comprising a substrate, a pair of intersecting waveguides on said substrate, each of said waveguides having a ridge and a waveguide guiding layer below said ridge with a narrow groove extending through said ridge and into said guiding layer at the intersection of said waveguides, said groove being at an angle of 45° to said orthogonal waveguides,



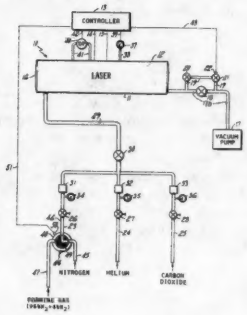
extending across the intersection of said waveguides, and having smooth, mirror-like surfaces.

4,888,786

LASER GAS COMPOSITION CONTROL ARRANGEMENT AND METHOD

Jack W. Davis, East Hartford, and Clyde O. Brown, New Britain, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 9, 1988, Ser. No. 191,927
Int. Cl.[4] H11S 3/22
U.S. Cl. 372—58 13 Claims



1. An arrangement for controlling a composition of a laser gas mixture flowing through the interior of a CO_2 laser and initially including at least nitrogen, helium and carbon dioxide constituent gases, comprising

means for measuring the humidity of the laser gas mixture present in the interior of the laser;

means for introducing into the interior of the laser, of the constituent components of water, only hydrogen for reacting with oxygen present in the gas mixture as an incident to the operation of the laser; and

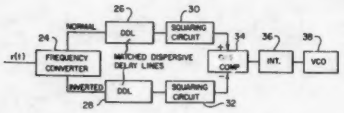
means for so controlling said introducing means during the operation of the laser in dependence on the humidity as measured by said measuring means as to maintain the dew point of the water vapor contained in the gas mixture within a predetermined range having a lower limit at a predetermined level above that corresponding to zero humidity.

4,888,787

RECEIVER APPARATUS FOR SPREAD SPECTRUM COMMUNICATION SYSTEMS

David Kisak, 2440 Research Blvd., Rockville, Md. 20850

Filed Sep. 26, 1988, Ser. No. 249,511
Int. Cl.[4] H04K 1/02
U.S. Cl. 375—1 9 Claims



1. Receiver apparatus for processing frequency hopped signals produced by frequency hopping or hybrid spread spectrum communication systems, said receiver apparatus comprising:

first and second dispersive delay lines connected in parallel branches to which a received frequency stepped carrier input signal is applied;

a first squaring circuit connected to said first dispersive delay line for squaring the output thereof;

a second squaring circuit connected to said second dispersive delay line for squaring the output thereof;

comparator means for comparing the outputs of said first and second squaring circuits and for producing an output related to the difference between the outputs of said squaring circuits;

integrator means for integrating over time the output of said comparator means and for producing a corresponding output voltage signal; and

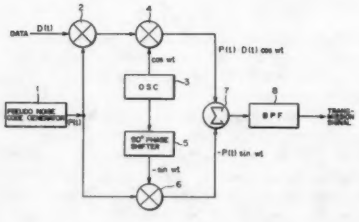
a voltage controlled oscillator connected to the output of said integrator means for producing an output signal the frequency of which is related to the output voltage of said integrator means and is representative of the instantaneous frequency of the carrier input.

4,888,788

TRANSMITTING AND RECEIVING SYSTEMS

Akio Teranishi, Ebina; Nobuo Genji, Osaka, and Kohji Itoh, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 16, 1987, Ser. No. 121,101
Claims priority, application Japan, Nov. 20, 1986, 61-277197; Nov. 20, 1986, 61-277216; May 11, 1987, 62-114152; May 11, 1987, 62-114153; Jul. 3, 1987, 62-167217
Int. Cl.[4] H04L 9/00
U.S. Cl. 375—1 6 Claims



1. A transmission/reception system comprising:

(I) a transmitter having

pseudo noise code generating means for generating a pseudo noise code,

a first mixer for modulating transmission data by the pseudo noise code of said code generating means,

oscillating means for generating a reference frequency signal,

phase shifting means for shifting the phase of the reference frequency signal of said oscillating means by 90°,

a second mixer for frequency converting an output of said first mixer by one of outputs of said oscillating means and said phase shifting means,

a third mixer for frequency converting the pseudo noise code of said code generating means by the other one of the outputs of the oscillating means and the phase shifting means, and

adding means for adding outputs of said second and third mixers; and

(II) a receiver having

phase shifting means for shifting the phase of the transmission signal of said transmitter by 90°,

arithmetic operating means for multiplying said transmission signal with an output of said phase shifting means, and

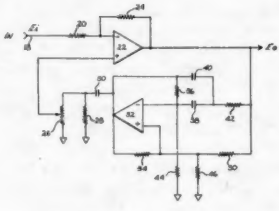
filtering means for allowing only a signal containing said transmission data in an output of said arithmetic operating means to pass.

4,888,789

ADJUSTABLE EQUALIZER FOR COMPENSATING FOR HIGH FREQUENCY ROLLOFF AND TYPICAL AM RECEIVERS

Robert A. Orban, 2413 Lincoln Ave., Belmont, Calif. 94002

Continuation of Ser. No. 363,611, Mar. 30, 1982, abandoned.
This application Jan. 14, 1985, Ser. No. 690,834
Int. Cl.[4] H03H 7/30
U.S. Cl. 375—12 12 Claims



1. An equalizer for an AM transmission system for compensating for high frequency rolloff in an AM receiver, comprises:

an AM transmitter including said equalizer

said equalizer having a differential amplifier;

a first resistive feedback path coupling the output of said amplifier to one input terminal of said amplifier, said one input terminal also being coupled to receive an input audio signal; and

a second feedback path coupling the output of said amplifier with the other input terminal of said amplifier, said second feedback path comprising a third-order filter and a potentionmeter disposed in said second feedback path for controlling the amount of said feedback, said filter for changing the spectral content of said audio signal,

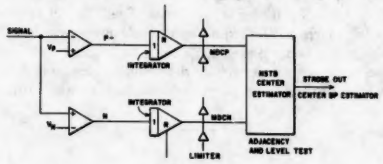
whereby said equalizer compensates for the high frequency rolloff in said AM receiver.

4,888,790

TIMING RECOVERY SYSTEM USING BIPOLAR-PATTERN CENTER ESTIMATOR

Hee Wong, San Jose, and Jesus Guines, Santa Clara, both of Calif., assignors to National Semiconductor Corp., Santa Clara, Calif.

Filed Oct. 14, 1987, Ser. No. 108,717
Int. Cl.[4] H04L 25/493
U.S. Cl. 375—20 11 Claims
MICROFICHE APPENDIX INCLUDED
(1 Microfiche, 31 Pages)



1. A bipolar-pattern center estimator for retrieving timing information from a received signal, the center estimator comprising:

(a) first slicer means for slicing the received signal at a first threshold level above a reference level to obtain a first signal comprising positive polar pulses;

(b) second slicer means for slicing the received signal at a second threshold level below the reference level to obtain a second signal comprising negative polar pulses;

(c) first filter means responsive to the first signal for generating a first filter output signal that fades toward the reference level within a given time constant to produce first triangular pulses corresponding to the positive polar pulses;

(d) second filter means responsive to the second signal for generating a second filter output signal that fades toward the reference level within the given time constant to produce second triangular pulses corresponding to the negative polar pulses; and

(e) means responsive to the first and second filter output signals for determining intersections of the first and second triangular pulses, the intersections corresponding to retrieved timing information.

4,888,791

CLOCK DECODER AND DATA BIT TRANSITION DETECTOR FOR FIBER OPTIC WORK STATION

Robert A. Barndt, Sr., 5 Regency Cir., Coatesville, Pa. 19320

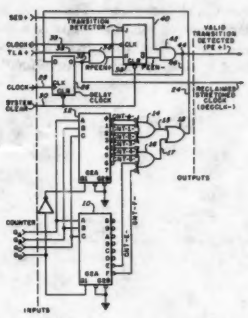
Filed Jan. 25, 1988, Ser. No. 147,490
Int. Cl.[4] H03K 9/10; H04L 7/02
U.S. Cl. 375—23 9 Claims

1. Apparatus for generating signals indicative of start and end transitions of a data bit of an incoming data stream and having a variable clock frequency encoded therein and transmitted in at least one of a plurality of bit rates, comprising:

decoder means responsive to a first signal indicative of a duration of said data bit for providing a second signal in binary form corresponding to said duration of said data bit,

monostable switch means responsive to a source of regular clock pulses and to said second signal for providing a third signal representative of said variable clock frequency at a predetermined delay with respect thereto, and

bistable switch means responsive to said delayed clock signal and to said source of regular clock pulses, and further responsive to a fourth signal indicative of start, midbit, and end transitions of said data bit, said bistable switch means having a first operative state when said third signal and said fourth signal are in coincidence and having a second operative state for producing a fifth signal representative of said start and end transitions but excluding said midbit transitions.

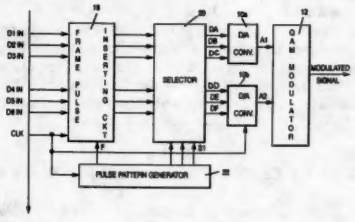


4,888,792

MULTI-LEVEL QUADRATURE AMPLITUDE MODULATION AND DEMODULATION SYSTEM

Takeshi Yagi, Otawara, and Kenzo Kobayashi, Sendai, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 12, 1988, Ser. No. 231,487
Claims priority, application Japan, Aug. 27, 1987, 62-213286
Int. Cl.[4] H04L 5/12
U.S. Cl. 375—39 9 Claims



1. A multi-level quadrature amplitude modulation and demodulation system, comprising:

a transmitter having a modulator and input terminals for receiving input digital signals, said transmitter including:

first exchange means, coupled to the input terminals, for cyclicly exchanging the order of the input digital signals and outputting first exchanged signals; and

D/A converters, coupled to said first exchange means and said modulator, for receiving the first exchanged signals and outputting analog signals to said modulator;

a receiver having a demodulator and output terminals, said receiver including:

A/D converters, coupled to said demodulator to receive the analog signals, for converting the analog signals to second exchanged signals; and

second exchange means, coupled to said A/D converters and the output terminals, for exchanging the second exchanged signals in a manner which is reversed with respect to said first exchange means, and for providing output digital signals respectively corresponding to the input digital signals.

4,888,793

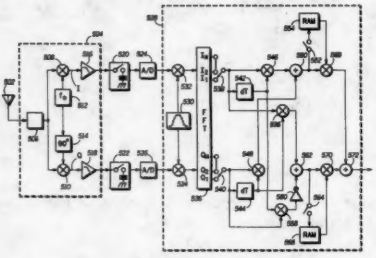
PHASE CORRECTING DPSK/PSK RECEIVER WITH DIGITALLY STORED PHASE CORRECTION DERIVED FROM RECEIVED DATA

Keith A. Chanroo, Coral Springs, and Francis R. Steel, deceased, late of Parkland, both of Fla. (by Lynne A. Steel, legal representative), assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 6, 1988, Ser. No. 190,904

Int. Cl.[4] H03D *3/22*

U.S. Cl. 375—84 **12 Claims**



1. A receiver, for receiving a DPSK modulated signal that includes a plurality of preamble bits and a plurality of information bits, said receiver comprising in combination:

receiver means for receiving said modulated signal;

phase angle means, coupled to said receiver means, for determining a function of the phase angle of each bit of said modulated signal at periodic time intervals;

phase error means, coupled to said phase angle means, for determining and storing a function of the phase error (PE), said phase error being a function of the difference between the phase angle (A_x) of a first bit and the phase angle (A_y) of a second bit of said preamble bits of the modulated signal; and

demodulation means, coupled to said phase angle and said phase error means, for demodulating said signal by comparing the phase angle (A_l) of a selected information bit (l) to the phase angle (A_{l-1}) of the previous bit (l-1) of the modulated signal, and by adjusting for said phase error

4,888,794

METHOD OF GENERATING AN IMAGE OF A LAYER OF AN OBJECT

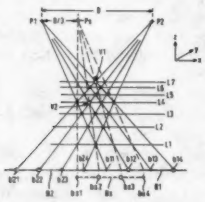
Paul R. Haaker, Hamburg; Erhard P. A. Klotz, Halstenbek; Reiner H. Koppe, Hamburg, and Rolf E. Linde, Haseldorf, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 24, 1988, Ser. No. 173,684

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1987, 3710011

Int. Cl.[4] G03C *9/00*

U.S. Cl. 378—41 **21 Claims**



1. A method of generating an image for display of an object, having layer planes (L1 . . . L7) of layer image points, in an examination zone (5) comprising:

irradiating said examination zone with penetrating radiation from a plurality of spaced-apart actual radiation source positions (P1 . . . P4);

collecting and storing single image point data indicative of radiation exiting said examination zone for a plurality of single images (B1 . . . B4), each due to a different actual radiation source position (P1 . . . P4), said layer image points being positioned so that the layer image point values can be determined from said single image point data; and

generating synthetic image point values for a synthetic image (Bs) of selected layer planes of said object as would be due to irradiation from a synthetic source position (Ps), which neighbors one (P1) of the actual source positions, said generating comprising: determining the contribution of said single image point data to each synthetic image point value.

4,888,795

VIDEOTELEPHONE APPARATUS FOR TRANSMITTING HIGH AND LOW RESOLUTION VIDEO SIGNALS OVER TELEPHONE EXCHANGE LINES

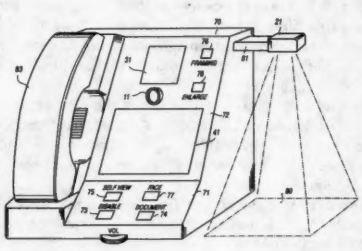
Fumio Ando; Kazuo Ichinokawa, and Takayuki Yokoyama, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jun. 28, 1988, Ser. No. 212,498

Claims priority, application Japan, Jun. 30, 1987, 62-163522; Jul. 24, 1987, 62-113666[U]

Int. Cl.[4] H04M *11/00;* **H04N** *7/14*

U.S. Cl. 379—53 **41 Claims**



1. A videotelephone apparatus comprising:

image pickup means for generating first and second high frame rate video signals representative of moving objects and objects which are standing still, respectively;

conversion means for converting said first high frame rate video signal to a low frame rate low resolution signal and converting the second high frame rate video signal to a single frame high resolution signal, each frame of said low frame rate low resolution signal having n×m pixels and the frame of said high resolution signal having N×M pixels, where N and M are respectively greater than n and m;

transmit means for transmitting said low frame rate low resolution signal and said single frame high resolution signal via a transmission medium to a destination apparatus;

receive means including a memory for receiving a low frame rate low resolution signal and a single frame high resolution signal from said destination apparatus and for storing said single frame high resolution signal into said memory and repeatedly retrieving it from the memory;

display means;

manually operated command entry means for generating a plurality of mode select signals in response to manual command inputs; and

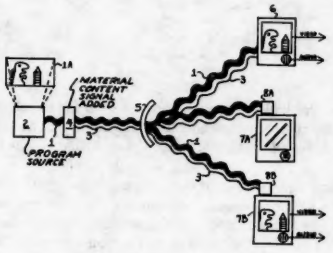
switching means responsive to said mode select signals for selectively coupling said low rate low resolution multiframe signal and said single frame high resolution signal to said transmit means and coupling signals from said receive means to said display means.

4,888,796

PROGRAM MATERIAL SCREENING DEVICE

John W. Olivo, Jr., 740 Central Ave., Hammonton, N.J. 08037

Filed Aug. 31, 1987, Ser. No. 91,646
Int. Cl.[4] H04M *1/00, 11/08*
U.S. Cl. 379—101 **20 Claims**



3. A program material screening device adapted to be connected to a program material receiver capable of recognizing and replaying a transmitted program material signal in humanly perceivable form, comprising (a) recognition means for detecting any supplemental material content signal transmitted with said program material signal and (b) disabling means for automatically selectively preventing, at the selection of and under the direct authorization of the receiver user, replay of the program material signal by the receiver upon detection of a material content signal by said recognition means.

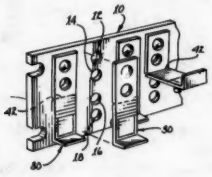
19. A telephone message screening device adapted to be connected in series between a telephone message source and a telephone, comprising (a) recognition circuitry capable of detecting one or more series of incoming dual tone multi-frequency signals prefacing or comprising a part of an incoming telephone message and (b) disconnect circuitry connected to said recognition circuitry such that on detection of one or more series of incoming dual tone multi-frequency signals by said recognition circuitry, said disconnect circuitry automatically prevens or interrupts said telephone from receiving telephone messages.

4,888,797

CIRCUIT PROTECTION DEVICE

Clifford C. Strait, Jr., 2810 E. Glencove, Mesa, Ariz. 85203

Filed Oct. 16, 1987, Ser. No. 109,501
Int. Cl.[4] H04M *1/00, 5/01, 5/10*
U.S. Cl. 379—438 **20 Claims**



1. A protection device for protecting a circuit against inadvertent and mistaken access to the output and input jacks in a DSX type panel to which the circuit is routed while accommodating visual access to a status light and access to a monitor jack, all pertaining to the same single circuit, said device comprising in combination:

(a) a fixed plate, said fixed plate including means disposed in said fixed plate for accommodating visual access to the status light and access to the monitor jack;

(b) a pivotable plate pivotable from a first position to a second position and return for shielding the output and input jacks when said pivotable plate is in the first position;

(c) means for interconnecting said fixed plate and said pivotable plate; and

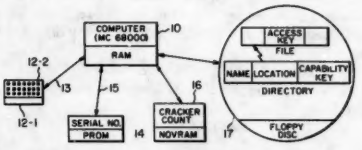
(d) means for securing said fixed plate to the DSX panel to retain said protection device in place.

4,888,798

MODULAR SOFTWARE SECURITY

Lester D. Earnest, Los Altos Hills, Calif., assignor to OMS, Inc., Mobile, Ala.

Continuation of Ser. No. 725,254, Apr. 19, 1985, abandoned.
This application Aug. 7, 1986, Ser. No. 894,085
Int. Cl.[4] H04L *9/00*
U.S. Cl. 380—4 **13 Claims**



1. A protection method for restricting access by a user to authorized ones of a plurality of software elements in a computer system where the computer system permanently stores an identity key, I_k distinguishing the computer system from other computer systems having the same software elements, comprising,

inputting a capability key, C_k, into the computer system for unlocking a selecting one of said plurality of software elements, said capability key specifying authorization being possessed by the user with respect to said selected software element in said system,

accessing an identity key, I_k, stored in the computer system for identifying the computer system,

transforming the capability key with the identity key to form a transformed key, T_k, including,

transforming the identity key, I_k, by at least one operation to form more than one control number, B_i,

successively transforming the capability key, C_k, using said control numbers, B_i, and a set of reversible transformation functions F_i to form the transformed capability key, T_k, as follows,

$$B_i F_i X_{i-1} = X_i,\ i = 1,2 \ldots N$$

wherein

$X_0 = C_k$

$X_N = T_k$,

accessing a stored key S_k, for said selected software element, said stored key defining authorization being expected for unlocking said selected software element,

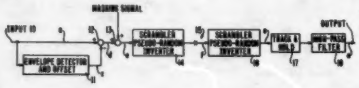
compairing said transformed key, T_k, and said stored key S_k,

allowing access to said selected software element if the stored key corresponding to said selected software element matches said transformed key.

4,888,799
SCRAMBLING OF SIGNALS BY INVERSION

Joseph G. Mobley, Dunwoody; Anatoly Kozushin, Duluth; Saeed Baher; Steve Addison, both of Atlanta; Howard Paulk, Woodstock, and James Farmer, Doraville, all of Ga., assignors to Scientific Atlanta, Inc., Atlanta, Ga.

Filed Jan. 3, 1986, Ser. No. 815,912
Int. Cl.[4] H04K *1/04*
U.S. Cl. 380—6 9 Claims



1. A method of scrambling a received audio signal, said method comprising the steps of:

obtaining a derived signal from said received audio signal,

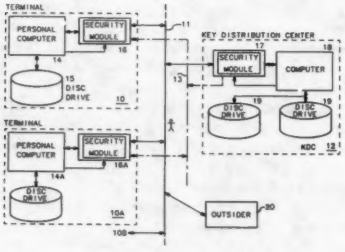
combining said derived signal with said received audio signal to produce a combined audio signal; and

inverting at least one selected portion of said combined audio signal.

4,888,800
SECURE MESSAGING SYSTEMS

Alan D. Marshall, Merchants Landing; Christopher J. Mitchell, Codford, and Graeme J. Proudler, Meade Park, all of England, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 1, 1988, Ser. No. 162,706
Claims priority, application United Kingdom, Mar. 3, 1987, 8704920
Int. Cl.[4] H04L *9/04*
U.S. Cl. 380—21 10 Claims



1. A secure messaging system comprising:

at least three terminals;

a key distribution center;

communication means for carrying messages amongst the terminals and between the terminals and the center; and

means for providing a key means, a key transport key, and a plurality of data transport keys,

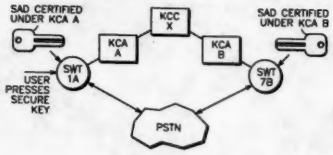
the center being responsive to a message requesting a communication link between first and second ones of the terminals to encrypt the key means according to the key transport key and to send the encrypted key means to both terminals,

each terminal being operative to decrypt the key means, to encrypt an associated one of the data transport keys according to the key means, to send the encrypted data transport key to the other terminal, to encrypt data according to the data transport keys, and to exchange the encrypted data with the other terminal.

4,888,801
HIERARCHICAL KEY MANAGEMENT SYSTEM

Robert I. Foster, Mesa; Robert F. Pfeifer, Scottsdale, and Thomas J. Mihm, Jr., Mesa, all of Ariz., assignors to Motorola, Inc.

Filed May 2, 1988, Ser. No. 188,868
Int. Cl.[4] H04L *9/02*
U.S. Cl. 380—21 24 Claims



1. A hierarchical key management system for enabling ones of a plurality of users to establish secure communications via a switching network, said hierarchical key management system comprising:

predefined user groups of said users;

each of said users prior to communication with one another having certification by a common authority said certification comprising the generation a a set asymmetric domain keys which are encrypted and modified to include the authorization predetermined time interval for which said certification is valid;

terminal means connected to said switching network, said terminal means for establishing secure communications through said switching network;

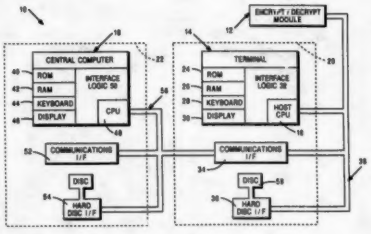
groups of terminal means, each group corresponding to said group of users, a first terminal means establishing communications with a second terminal means via said switching network; and

said first and second terminal means directly establishing secure communications via said switching network, without subsequent connection to said common authority.

4,888,802
SYSTEM AND METHOD FOR PROVIDING FOR SECURE ENCRYPTOR KEY MANAGEMENT

Henry G. Cooney, Kettering, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Jun. 17, 1988, Ser. No. 208,326
Int. Cl.[4] H04L *9/02;* H04R *1/00*
U.S. Cl. 380—49 7 Claims



1. A system for providing secure key management and storage comprising:

a host terminal including a processor for executing instructions;

an encryption module for encrypting/decrypting data; and

a first bus for coupling said encryption module with said host terminal;

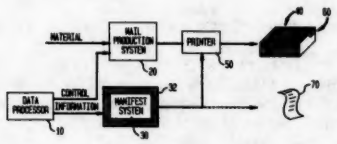
said encryption module comprising:
a data ciphering chip for encrypting/decrypting data;
storing means including a static RAM for storing at least a key therein;
a second bus for directly coupling said storing means with said data ciphering chip for transferring key to said ciphering chip for use thereby and for transferring said key back to said static RAM;
interface means for coupling said second bus with said first bus;
said processor being effective to install said key in said static RAM of said storing means; and
said interface means having means for uncoupling said second bus from said first bus with regard to accessing said key whenever said key is to appear on said second bus after being installed in said storing means by said processor so as to effectively make said RAM a hardware extension of said data ciphering chip and so as to make said key unavailable to said host terminal for reading said key.

4,888,803

METHOD AND APPARATUS FOR VERIFYING A VALUE FOR A BATCH OF ITEMS

Jose Pastor, Westport, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Sep. 26, 1988, Ser. No. 249,155
Int. Cl.[4] G09C *3/08*; H04L *15/34*
U.S. Cl. 380—51 **9 Claims**



1. A method for verifiably marking a batch of items, comprising the steps of:
(a) generating an encrypted message to identify said batch;
(b) expressing said encrypted message in the form of k ordered numbers
(c) defining a function, f, having k parameters each chosen equal to a particular one of said ordered numbers and such that the values of said parameters may be determined from k unique ordered pairs of numbers of the form x_i, $f(x_i)$;
(d) selecting a unique value, x_i, for each of said items;
(e) computing a value, $f(x_i)$ for each of said x_i;
(f) marking each of said items with an ordered pair of numbersx_i, $f(x_i)$; whereby
(g) a second party may verify said batch by selecting k items to obtain k unique ordered pairs, x_i, $f(x_i)$, determining said parameters to obtain said message, and determining if said message correctly identifies said batch.

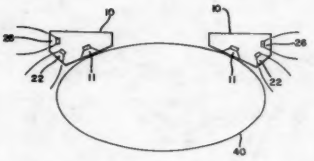
4,888,804

SOUND REPRODUCTION SYSTEM

Herbert I. Gefvert, 495 S. Green Bay Rd., Lake Forest, Ill. 60045

Filed May 12, 1988, Ser. No. 193,900
Int. Cl.[4] H04R *5/02*
U.S. Cl. 381—24 **19 Claims**

1. A sound reproduction system for providing a sonic image within a defined listening area in response to a plurality of audio channel signals, said system comprising a plurality of transducer enclosure means, each of said enclosure means having:
main transducer means for receiving one of said audio channel signals and providing direct reproduction of essentially the entire frequency band thereof, said main transducer means being directed into the listening area and having a dispersion profile which substantially defines the listening area;
boundary transducer means for receiving said one audio channel signal, said boundary transducer means having means for phase-shifting said one audio channel signal by 180 degrees and means for limiting the bandwidth of said one audio signal to a first predetermined range, whereby said boundary transducer means provides reproduction of a frequency band-limited and 180 degree phase-shifted audio channel signal, said boundary transducer means being directed at an angle of substantially 65 degrees with respect to said main transducer means; and



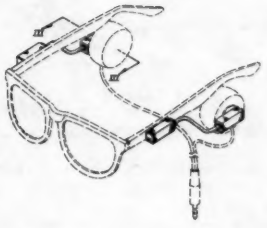
expansion transducer means for receiving said one audio channel signal, said expansion transducer means having means for limiting the bandwidth of said one audio channel signal to a second predetermined range, whereby said expansion transducer means provides reproduction of a frequency band-limited audio channel signal, said expansion transducer means being directed outwardly from the listening area;
said enclosure means being adapted to provide structural support for said main, boundary and expansion transducer means and to maintain a predetermined angular relationship therebetween.

4,888,805

STEREO HEAD HEADPHONES BRACKET SYSTEM

Lauri A. Karppala, Jr., P.O. Box 19911, Sacramento, Calif. 95819-0911

Filed Nov. 23, 1988, Ser. No. 274,840
Int. Cl.[4] H04R *5/02*
U.S. Cl. 381—25 **2 Claims**



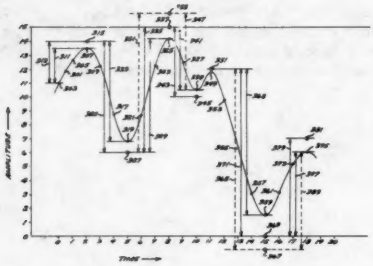
1. A stereo headphone bracket system comprising, for each temple arm of a pair of eyeglasses, a socket receiver attached to the respective temple arm, a removable socket plug mated with said receiver, said plug attached at one end of semirigid plastic coated wire having a plastic molded plug at its other end, said molded plug mated to a receiver block attached to a respective stereo headphone.

4,888,806

COMPUTER SPEECH SYSTEM

Keith R. Jenkin, San Marcos, and Shufan Chan, Encinitas, both of Calif., assignors to Animated Voice Corporation, San Marcos, Calif.

Filed May 29, 1987, Ser. No. 56,502
Int. Cl.[4] G10L 5/00
U.S. Cl. 381—35 41 Claims



1. A method of compressing a signal consisting of a stream of samples which represent a segment of human speech, the method comprising:

sequentially examining the samples until a sample is found which comprises a maximum in relation to its adjacent predecessor and successor samples;

sequentially examining the samples which follow the maximum sample until a sample is found which comprises a minimum in relation to its adjacent predecessor and successor samples;

calculating (1) a first delta number indicative of the algebraic difference between the minimum and maximum samples found in the preceding steps and (2) a first time number indicative of how much time elapsed between the occurrences of said minimum and maximum samples;

calculating (1) a first delta number indicative of the algebraic difference between the minimum and maximum samples found in the preceding steps and (2) a first time number indicative of how much time elapsed between the occurrences of said minimum and maximum samples;

sequentially examining the samples which follow said minimum sample until a sample is found which comprises a maximum in relation to its adjacent predecessor and successor samples; and

calculating (1) a second delta number indicative of the algebraic difference between the maximum sample found in the preceding step and the minimum sample found previously and (2) a second time number indicative of how much time elapsed between the occurrences of the maximum sample found in the preceding step and the minimum sample found previously.

4,888,807

VARIABLE PATTERN MICROPHONE SYSTEM

Kenneth R. Reichel, Hudson, Ohio, assignor to Audio-Technica U.S., Inc., Stow, Ohio

Filed Jan. 18, 1989, Ser. No. 298,068
Int. Cl.[4] H04R 3/00
U.S. Cl. 381—92 14 Claims

1. A variable pattern microphone system comprising:

a first sound transducer with an omnidirectional pick-up pattern;

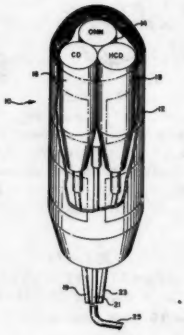
a second sound transducer with a cardioid pick-up pattern;

a third sound transducer with a hypercardioid pick-up pattern;

means for equalizing the phase and acoustical balance between said first transducer and said second and third transducers to produce a first equalized output;

means for equalizing the phase and acoustical balance between said second transducer and said first and third transducers to produce a second equalized output;

means for equalizing the phase and acoustical balance between said third transducer and said first and second transducers to produce a third equalized output; and



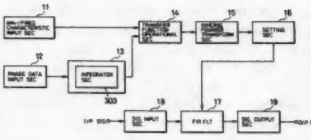
means for combining said first, second and third equalized outputs to provide a combined signal having a selectable pick-up pattern from the microphone system.

4,888,808

DIGITAL EQUALIZER APPARATUS ENABLING SEPARATE PHASE AND AMPLITUDE CHARACTERISTIC MODIFICATION

Seiichi Ishikawa; Masaharu Matsumoto; Katsuaki Satoh, and Akihisa Kawamura, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 22, 1988, Ser. No. 171,713
Claims priority, application Japan, Mar. 23, 1987, 62-68410; Mar. 23, 1987, 62-68413; May 8, 1987, 62-113049; May 8, 1987, 62-113054; May 14, 1987, 62-117375; May 14, 1987, 62-117376; May 14, 1987, 62-117377; May 14, 1987, 62-117378; Dec. 17, 1987, 62-319452
Int. Cl.[4] H03G 5/00
U.S. Cl. 351—103 31 Claims



1. A digital equalizer apparatus comprising:

amplitude/frequency input means for providing amplitude/-frequency characteristic data representing an arbitrary amplitude/frequency characteristic;

phase data input means for providing data for establishing a phase/frequency characteristic, said data being in a category selected from a group of categories of data which includes phase/frequency characteristic data, group delay characteristic data, amplitude/frequency characteristic data, and data expressing a resonance condition of a predetermined type of electrical circuit;

phase/frequency operational means for computing phase/-frequency characteristic data based upon said data from said phase data input means;

transfer function operational means for operating on said amplitude/frequency characteristic and phase/frequency

characteristic data to derive transfer function data representing a transfer function;

inverse Fourier transform means for operating on said transfer function data to derive impulse response characteristic data representing an impulse response characteristic determined by said transfer function;

finite impulse response filter means;

signal input means for transferring to said finite impulse response filter means an input audio signal as a train of digital samples;

signal output means for receiving said audio signal after frequency characteristic modification of said audio signal by said finite impulse response filter means, and for transferring the modified audio signal to an external system; and,

setting means operable for establishing a set of filter coefficients for said finite impulse response filter means having respective values determined by said impulse response characteristic.

4,888,809

METHOD OF AND ARRANGEMENT FOR ADJUSTING THE TRANSFER CHARACTERISTIC TO TWO LISTENING POSITION IN A SPACE

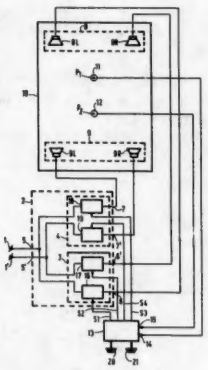
Charles L. C. M. Knibbeler, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 1, 1988, Ser. No. 239,573

Claims priority, application Netherlands, Sep. 16, 1987, 8702200

Int. Cl.[4] H03G *5/00*

U.S. Cl. 381—103 **12 Claims**



1. A method of adjusting the frequency-response characteristic of the transmission of an electric signal which is applied to an input terminal of an amplifier unit and which is converted to an acoustic signal at least one listening position in a space via two electro-acoustic transducer devices, the electric signal being applied, via the input terminal, to a first and a second filter unit belonging to the amplifier unit and having an output coupled to the first and the second transducer device respectively, characterized in that for adjusting the frequency-response characteristics of the transmission of the electric signal, applied to the input terminal, to an acoustic signal at at least two non-coincident listening positions in the space, said two non-coincident listening positions being separated by a distance sufficient to allow at least one person to occupy one of said non-coincident positions and to allow at least a second person to occupy the other of said non-coincident positions:

(a) the levels of the electric signals applied to the first and the second transducer device are adjusted in such way that the acoustic signals delivered by the first and the second transducer device provide substantially equal contributions to the acoustic signal at the location of the first listening position;

(b) the second filter unit is adjusted so as to obtain a desired frequency-response characteristic for the transmission of the electric signal, applied to the input terminal, to the acoustic signal at the second listening position;

(c) the first filter unit is adjusted in such a way that in the presence of an electric signal applied to the second transducer device a desired frequency-response characteristic is obtained for the transmission of the electric signal, applied to the input terminal, to the acoustic signal at the first listening position, in that the first and the second listening position are situated at least substantially between the first and the second transducer device in the space.

4,888,810

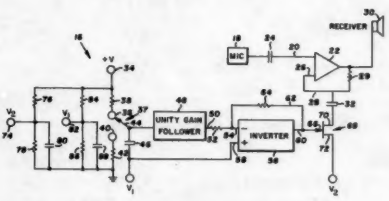
ANALOG VOLUME CONTROL CIRCUIT

David A. Preves, Edina, Minn., assignor to Argosy Electronics, Eden Prairie, Minn.

Continuation-in-part of Ser. No. 81,754, Aug. 5, 1987. This application Jan. 19, 1989, Ser. No. 299,726

Int. Cl.[4] H03G *3/00*

U.S. Cl. 381—109 **11 Claims**



1. An apparatus adjustably controlling the amplification of audio signals received by a hearing aid, said apparatus including:

an audio sensing means for receiving an audio signal and generating a first electrical signal corresponding to said sensed audio signal;

an amplifying means having a signal input for receiving said first electrical signal, and a control input for receiving an electrical control signal, for generating a second electrical signal corresponding to said first electrical signal and amplified in accordance with a gain determined by the level of said control signal;

a receiver means for generating an acoustic signal corresponding to said second electrical signal; and

a control means for providing said control signal to said control input, including a field effect transistor, a biasing means for biasing a source terminal of said field effect transistor at a first predetermined voltage level, a coupling means for electrically connecting a drain terminal of said field effect transistor to said control input, and a manually operable means for selectively varying a gate voltage level applied to a gate terminal of said field effect transistor, thereby to selectively vary the conductivity of said field effect transistor between said drain and source terminals;

said manually operable means for selectively varying the gate voltage level including a holding circuit, and a switch movable among three discrete positions, including a first closed position for electrically connecting said holding circuit to a positive voltage source to increase the voltage level in said holding circuit, a second closed position for electrically connecting the holding circuit to ground to decrease the voltage level in said holding circuit, and an

open position for maintaining a substantially constant voltage level in said holding circuit; and

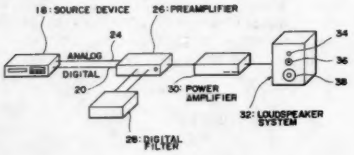
a comparator means having a first input proportional to said holding circuit voltage level and a second input biased to a second predetermined voltage level, said comparator means generating a difference signal proportional to the difference between the voltage levels at said first and second inputs, and providing said difference signal to said gate terminal as said gate voltage level.

4,888,811

LOUDSPEAKER DEVICE

Makino Takashi, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Aug. 6, 1987, Ser. No. 82,644
Claims priority, application Japan, Aug. 8, 1986, 61-186198
Int. Cl.[4] H04R *3/04, 5/02*
U.S. Cl. 381—111 **7 Claims**



1. A loudspeaker device having a digital filter for adjusting sound pressure and phase characteristics comprising:

input means for obtaining a digital input signal representing a sound to be sounded by a loudspeaker;

phase control means for receiving the digital signal from said input means, said phase control means including a digital filter having means for controlling sound pressure-frequency characteristics and phase-frequency characteristics thereof independently from each other;

loudspeaker drive means for producing a loudspeaker drive signal in accordance with the modified digital signal; and

loudspeaker means driven by said loudspeaker drive signal.

4,888,812

DOCUMENT IMAGE PROCESSING SYSTEM

Raymond F. Dinan, Mint Hill, N.C.; James F. Dubil, Lake Wylie, S.C.; Jerald R. Malin, Charlotte, N.C.; Robert R. Rodite, Matthews, N.C.; Clair F. Rohe, Charlotte, N.C., and Gene D. Rohrer, Concord, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 18, 1987, Ser. No. 134,734
Int. Cl.[4] G06K *9/00, 7/14*
U.S. Cl. 382—7 **34 Claims**

1. A system for high speed capture, processing and storage of video image data from documents, such as bank checks, comprising

document transport means for transporting a series of successive documents along a predetermined path of travel,

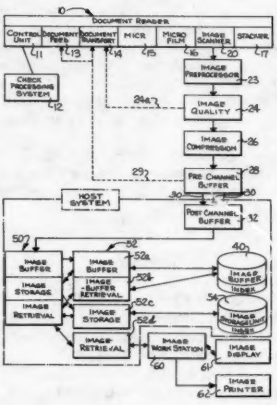
document scanner means cooperating with said transport means for optically scanning the successive documents and for converting optically perceptible images thereon into video image data,

image processor means cooperating with said document scanner means for receiving video image data and for converting the data into low resolution digital gray scale video image data representing the optically perceptible images on the documents as well as into higher resolution black and white video image data representing the optically perceptible images,

data compression means associated with said image processor means for receiving and compressing the video image data obtained from the documents,

a high speed data channel for receiving the compressed video image data from said compression means at a relatively high data transfer rate,

a high speed mass data storage device connected to said high speed data channel for receiving and temporarily storing the compressed video image data, and



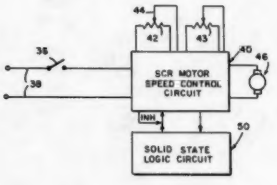
a relatively lower speed mass data storage device for receiving the compressed video image data from said high speed data storage device and for storing the compressed video image data for subsequent retrieval.

4,888,813

ELECTRONIC SPEED CONTROL INTERLOCK

Paul E. Penn, Indianapolis, and Gary R. Grissom, Zionsville, both of Ind., assignors to Dart Controls, Inc., Zionsville, Ind.

Filed Mar. 21, 1988, Ser. No. 170,828
Int. Cl.[4] H02P *5/06*
U.S. Cl. 388—838 **4 Claims**



1. A motor controller for use on a treadmill to prohibit the treadmill from operating at high speed immediately upon energization, the controller including a speed setting potentiometer, a motor speed control circuit, and means for coupling the speed setting potentiometer to the speed control circuit so that the speed setting potentiometer's position controls motor speed thereby controlling treadmill speed, the means for coupling the speed setting potentiometer to the speed control circuit includes a solid state logic circuit having a first condition and a second condition, means for coupling the speed setting potentiometer to the solid state logic circuit, means for providing a minimum speed-related signal for the motor, means for coupling the minimum speed-related signal providing means to the solid state logic circuit, the first condition of the solid state logic circuit indicating that the speed setting potentiometer is not in a position corresponding to a minimum speed condition of the motor and thereby of the treadmill, the second condition of the solid state logic circuit indicating that the speed setting

potentiometer is in a position corresponding to a minimum speed condition of the motor and thereby of the treadmill, a buffer circuit for coupling the condition of the solid state logic circuit to the speed control circuit, means for coupling the buffer circuit to the solid state logic circuit, and means for coupling the buffer circuit to the speed control circuit.

4,888,814

PATTERN RECOGNITION APPARATUS USING OSCILLATING MEMORY CIRCUITS

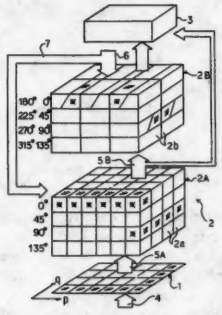
Youko Yamaguchi, and Hiroshi Shimizu, both of Tokyo, Japan, assignors to Research Development Corporation of Japan, Tokyo, Japan

Continuation of Ser. No. 158,779, Sep. 24, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 314,301

Claims priority, application Japan, Feb. 22, 1987, 62-38883; Sep. 24, 1987, 62-239541

Int. Cl.[4] G06K *9/48*

U.S. Cl. 382—21 **4 Claims**



1. A pattern recognition system comprising:

a preprocessing unit receiving a given pattern for converting the given pattern into a two-dimensional bit pattern;

a first cell block having a plurality of layers each of which is composed of a plurality of nonlinear oscillators arranged in a two-dimensional matrix, the nonlinear oscillators in each of the layers being coupled to the preprocessing unit so as to be excited by a corresponding bit of the bit pattern, the nonlinear oscillators in each of the layers being coupled to adjacent nonlinear oscillators in the same layer so as to mutually emphasize the oscillation in a predetermined direction different from those predetermined for the other layers, so that in each of the layers, there are selectively excited the nonlinear oscillators arranged to correspond to a continuous line segment formed in the two-dimensional bit pattern and aligned in a direction coincident with the excitation emphasizing direction of that layer;

a second cell block having a plurality of layers each of which is composed of a plurality of nonlinear oscillators arranged in a two-dimensional matrix, each of the nonlinear oscillators in each of the layers of said second cell block being coupled to at least one of the plurality of nonlinear oscillators of said first cell block, the nonlinear oscillators in each of the layers being coupled to adjacent nonlinear oscillators in the same layer so as to mutually emphasize the oscillation only in a predetermined orientation different from those predetermined for the other layers, so that in each of the layers, there are selectively excited the nonlinear oscillators corresponding to an end of a continuous line segment formed in the two-dimensional bit pattern and aligned in a direction coincident with the direction of that layer; and

a memory composed of a plurality of nonlinear oscillators coupled to the first and second cell blocks and selectively excited by the exciting nonlinear oscillators of the first and second cell blocks,

whereby the nonlinear oscillators of the memory corresponding to an exciting pattern of the exciting nonlinear oscillators of the first and second cell blocks oscillate at a frequency inherent to the given pattern.

4,888,815

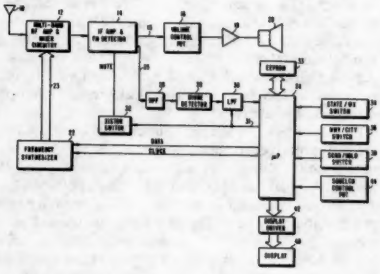
SCANNING RADIO RECEIVER

William B. Ahlemeyer, Indianapolis; Ben F. McCormick, II, Noblesville, and Stephen T. Crum, Indianapolis, all of Ind., assignors to Uniden America Corporation, Ft. Worth, Tex.

Continuation of Ser. No. 020,785, , abandoned, which is a division of Ser. No. 834,278, Jul. 10, 1986, abandoned. This application Sep. 18, 1987, Ser. No. 98,285

Int. Cl.[4] H03J *7/18*

U.S. Cl. 455—168 **6 Claims**



1. A scanning radio receiver, comprising:

a frequency synthesizer;

first memory means for storing digital codes for the frequencies allocated to a particular service in each of a plurality of geographical regions;

second memory means for storing identification data for each of said geographical regions;

first switch means for selecting a geographical region operable in a first state to sequentially scan said identification data and in a second state to terminate the scan upon reaching a selected geographical region;

a control circuit, said control circuit having means responsive to said first switch means in said state position for sequentially reading the digital codes for the frequencies allocated to a particular service for a selected geographical region, and means for sequentially loading said frequency synthesizer with said digital codes read from said first memory means;

an RF amplifier;

a mixer connected to respective outputs of said RF amplifier and said frequency synthesizer;

an IF amplifier-detector connected to said mixer;

an audio output circuit connected to said IF amplifier-detector;

squelch circuit means for disabling said audio output circuit in the absence of a detected signal on any one of the frequencies corresponding to said sequentially read digital codes; and

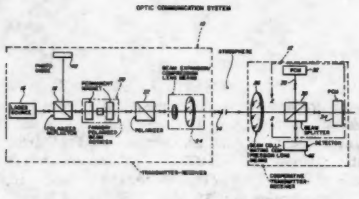
display means having means responsive to said first switch means for displaying a two character code corresponding to said geographical region selected.

4,888,816

TWO-WAY OPTIC COMMUNICATION SYSTEM FOR ATMOSPHERIC USE

Louis Sica, Jr., Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 5, 1989, Ser. No. 293,788
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—607 **8 Claims**



1. A two-way optic communication system for atmospheric use comprising:

transmitter-receiver TR means and cooperative transmitter-receiver CTR means where the TR means and the CTR means have an optical axis extending therebetween and are arranged relative to and spaced from each other along the optical axis of the system so as to define an atmosphere region therebetween and also to effect propagation of opposed beams with minimal leakage and in opposite directions therebetween;

the TR means being made up of laser source means, first and second polarizer means, polarized beam rotator PBR means and beam expansion/compression lens BECL means, the PBR means being interposed between the first and second polarizer means, the BECL means being disposed outwardly of and spaced from the second polarizer means, the laser source means projecting a polarized source beam through the first polarizer means, the PBR means, the second polarizer means and the BECL means such that the PBR means rotates the polarized source beam output of the first polarizer means a predetermined amount in a direction about the optical axis prior to the rotated and polarized source beam output of the PBR means being passed through the second polarizer means, the BECL means providing outward lateral expansion of the polarized and rotated source beam output of the second polarizer means as the beam output is propagated along the optical axis in one direction from the TR means to the CRT means, and

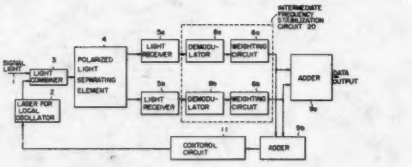
the CTR means being generally made up of beam collimating/ compression lens BCCL means, beam splitter BS means and first and second phase conjugate mirror PCM means, the first and second PCM means being disposed in spaced operative and angular relation to the BS means such that one of the PCM means is coincident with the optical axis but spaced from the BS means in a direction toward the inner end of the CTR means while the other PCM means is disposed within the CTR means but spaced from both the BS means and the one PCM means and arranged in angular relation to the one PCM means and the optical axis therethrough, the BS means for splitting the polarized and rotated source beam output after the BCCL means so as to form one and an other beam portions with one beam portion being directed to the first PCM means and with the other beam portion being directed to the second PCM means, the first and second PCM means reflecting the one and other beam portions and directing them toward the BS means, while at the same time the first and second PCM means cause phase conjugation of the reflected one and the other beam portions; the BS means combining the reflected one and other phase conjugated beam portions and then directing them for propagation along the optical axis in a direction toward the BCCL means and the TR means, the BCCL means for collimating the reflected and combined phase conjugated beam portions whereby the combined and reflected phase conjugated beam portions in propagating from the CTR means as a collimated output of the BCCL means to the TR means are not subject to atmospheric turbulence during system use.

4,888,817

POLARIZATION DIVERSITY LIGHT RECEIVING SYSTEM USING BASEBAND COMBINING

Shiro Ryu, Ichikawa, and Kiyofumi Mochizuki, Hachioji, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,817
Claims priority, application Japan, Oct. 28, 1987, 62-270367
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—619 **3 Claims**



1. A polarization diversity light receiving system using baseband combining in which signal light of an arbitrary plane of polarization as a result of its propagation over an optical fiber, is split into orthogonal polarized wave components and detected by use of oscillation light output from a local oscillator laser, the polarized wave components are detected to obtain electrical signals which are then combined, characterized by:

intermediate frequency stabilizing means for discriminating the frequency of each of the electrical signals, and for generating an output voltage corresponding to a variation in the frequency, and for weighing the output voltage to develop a square value of each electrical signal; and

adding means for combining voltage outputs of the intermediate frequency stabilizing means;

means connected to the adding means for developing a control signal, which is the sum of the squared values of the electrical signals obtained by the adding means, applied to control the local oscillator laser, thereby stabilizing its frequency.

4,888,818

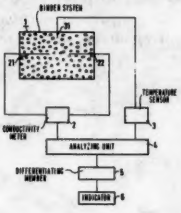
METHOD AND APPARATUS FOR THE DETERMINATION OF THE SETTING PROCESS IN AN INORGANIC AQUEOUS BINDER SYSTEM

Wolfgang Schmitt, Neu Isenburg, and Dietmar Bege, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 28, 1987, Ser. No. 43,835
Claims priority, application Fed. Rep. of Germany, Apr. 29, 1986, 3614468
Int. Cl.[4] G01N 27/02; G01R 27/02
U.S. Cl. 324—439 **4 Claims**

1. A method for the determination of the setting process in an inorganic aqueous binder system, which comprises, continuously measuring the electrical conductivity in an inorganic aqueous binder system between two electrodes of a conductivity meter, which are disposed opposite each other in the binder system to obtain a chronological variation of the conductivity in the binder system, differentiating according to time said chronological variation of the conductivity to form a first

derivative according to time to indicate a change of speed of the variation in conductivity, and monitoring the first derivative of the conductivity to determine progress in the setting process of the binder system.

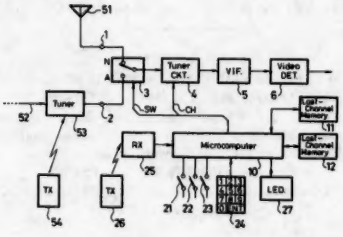


4,888,819

TELEVISION ON CHANNEL SELECTING APPARATUS WITH SEQUENTIAL SELECTION OF AUXILIARY SIGNAL SOURCE

Omasu Oda, Tokyo, and Toshio Amano, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 26, 1988, Ser. No. 199,249
Claims priority, application Japan, May 28, 1987, 62-132391
Int. Cl.[4] H04B *1/16*
U.S. Cl. 358—192.1 **14 Claims**



1. A television on-channel selecting apparatus comprising:
(a) first signal input means for receiving signals from a first broadcasting system;
(b) second signal input means for receiving signals from a second broadcasting system;
(c) first tuner means for tuning a plurality of channels of said first broadcasting system and an auxiliary channel;
(d) second tuner means for tuning a plurality of channels of said second broadcasting system and for outputting a signal on said auxiliary channel;
(e) switching means connected to receive an output of said first signal input means and an output of said second tuner means and for providing an output to said first tuner means;
(f) key means for controlling said first tuner means to sequentially select said plurality of channel of said first broadcasting system and said auxiliary channel;
(g) indicating means responsive to said first tuner means for indicating a selected one of said plurality of channels of said first broadcasting system as numerals, and said auxiliary channel, when selected, as a non-numeral character;
(h) control signal generating means connected to said key means and to said first tuner means for supplying channel selection signals to said first tuner means and switching signals to said switching means, said control signal generating means causing said first tuner means to sequentially select channels of said first broadcasting system by keys corresponding to said numerals and said non-numeral character, and said control signal generating means supplying a switching signal for automatically selecting the output of said second tuner for connection to said first tuner only when said auxiliary channel is selected.

4,888,820

STACKED INSULATING FILM INCLUDING YTTRIUM OXIDE

Ih-Chin Chen, Richardson; Bing W. Shen, Richardson; James G. Bohlman, Forney, and Hun-Lian Tsai, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 6, 1988, Ser. No. 280,778
Int. Cl.[4] H01G *4/06, 3/075;* H01L *23/93, 21/70*
U.S. Cl. 361—313 **23 Claims**

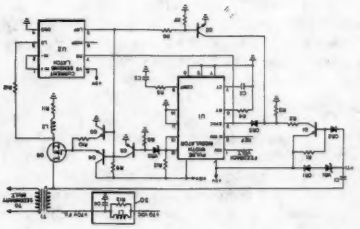
1. A capacitor for an integrated circuit, comprising:
a first plate comprising silicon;
a first dielectric film comprising silicon nitride disposed adjacent to said first plate;
a second dielectric film comprising yttrium oxide disposed adjacent said first dielectric film and opposing said first plate; and
a second plate disposed adjacent said second dielectric film and opposing said first plate.

4,888,821

SYNCHRONIZATION CIRCUIT FOR A RESONANT FLYBACK HIGH VOLTAGE SUPPLY

Charles H. Hamp, III, and Paul F. L. Weindorf, both of Albuquerque, N. Mex., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 9, 1988, Ser. No. 282,436
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—21 **4 Claims**



1. A synchronization circuit for a resonant flyback high voltage supply having a power switch transistor and a coupled inductor for use in providing a high voltage output comprising:
(a) means for filtering input power having a filtered output terminal;
(b) coupled inductor means having primary and secondary windings where the primary winding includes a first terminal connected to the filtered output terminal and also incudes a second terminal;
(c) a first capacitor, first, second, third, fourth and fifth

resistors, first, second and third diodes, a first zener diode and first and second transistors arranged to provide a negative slope detector wherein a first terminal of the first capacitor is electrically connected to the second primary winding terminal;

(d) means for providing pulse width modulation including a syncronous input connected to the cathode of the third diode and further including a compensation input, a feedback voltage input, a reference voltage input, first and second ramp inputs and an output where the first and second ramp inputs are connected to a ramp network;

(e) a second zener diode having a cathode connected to the pulse width modulation output;

(f) a third transistor having a base connected to the anode of the second zener diode and including a collector;

(g) a sixth resistor also connected to the base of the third transistor;

(h) a fourth transistor having a collector connected through a seventh resistor to the pulse width modulator output and having a base connected to the collector of the third transistor;

(i) a fifth transistor having a base connected to the base of the fourth transistor and to one terminal of the fifth resistor;

(j) an eighth resistor connected between the emitter of the fifth transistor and the emitter of the fourth transistor;

(k) means for switching having a first terminal connected to the emitter of the fourth transistor, a second terminal connected to the second terminal of the primary winding and having a third terminal;

(l) a second inductance means connected to the third terminal of the switching means;

(m) a ninth resistor connected in series with the second inductance means;

(n) current sensing latch circuit means including a low input connected through a tenth resistor to the third terminal of the switching means, further including a reset input connected to the synchronous input, and an output connected to the base of the fifth transistor;

(o) means for multiplying the voltage coupled through the coupling means at the secondary winding of the coupling means, the multiplying means providing a voltage output; and

(p) means for filtering and dividing the voltage output of the multilying means having an anode feedback voltage output connected to the feedback voltage input.

4,888,822

APPARATUS AND METHOD FOR DETERMINING COST OF TELEPHONE CALLS

Gerald J. Weinberger, Smithtown; Roger C. Lee, Wading River, and Stanley F. Miller, Rocky Point, all of N.Y., assignors to Rates Technology Inc., Smithtown, N.Y.

Filed Jan. 5, 1989, Ser. No. 293,741
Int. Cl.[4] G06F *15/21*
U.S. Cl. 379—130 **24 Claims**

1. A self-contained device for determining and displaying information relating to the cost of a telephone call from a calling telephone having a calling area code and a calling exchange associated therewith to a called telephone having a called telephone number including a called exchange number and which may include a called area code number, comprising:

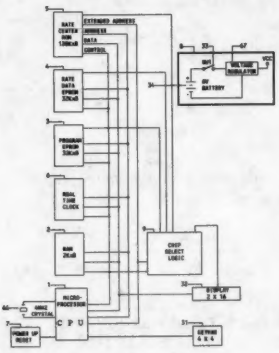
a keyboard having a plurality of keys;

a display;

means for placing the device in a number entry state wherein a called telephone number may be entered by pressing selected keys of the keyboard;

rate data memory means containing stored information as to cost parameters for telephone calls from a calling telephone in the calling exchange to a multiplicity of called local and non-local telephone numbers including long distance telephone numbers, said information including information as to the cost parameters for long distance telephone calls using the services of a number of long distance carriers;

service designation means for selecting from said rate data memory means the cost parameters corresponding to a desired one of said long distance carriers in response to the pressing of a corresponding key of said keyboard; and



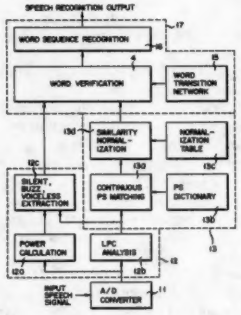
verify means coupled to said rate data memory means and said service designation means, said verify means being operative in a Verify mode of said device for determining and displaying the actual cost of a telephone call having a duration entered into the keyboard, from a telephone in the calling exchange to a called telephone having a called telephone number entered via the keyboard when said device is in the number entry state thereof.

4,888,823

SYSTEM FOR CONTINUOUS SPEECH RECOGNITION THROUGH TRANSITION NETWORKS

Tsuneo Nitta, Yokohama; Kensuke Uehara, Tokyo, and Sadakazu Watanabe, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 28, 1987, Ser. No. 101,789
Claims priority, application Japan, Sep. 29, 1986, 61-227961
Int. Cl.[4] G10L *7/08*
U.S. Cl. 381—43 **12 Claims**



3. A system for speech recognition comprising:

means for extracting prescribed feature parameters including phonetic segment units and a label sequence composed of a series of labels each having its corresponding value and representing prescribed features of phonetic segment units from input continuous speech signals;

means for obtaining similarities on the phonetic segment units extracted from input continuous speech signals by executing continuous matching of the extracted phonetic segment units with a voice dictionary compiled of the phonetic segment units having prescribed phonetic meanings so that a sequence of a plurality of similarities is obtained;

means for converting the similarity of phonetic segment obtained by the similarity obtaining means into a normalized similarity having a normalized standard value;

means for extracting a sequence of a plurality of phonetic segment likelihoods up to a prescribed placing or order based on the normalized standard values of the normalized similarities;

means for selectively scoring the values of the labels with respect to predetermined phonetic segments except for transitional phonetic segments obtained in said feature parameter extracting means by accumulating the values of the labels;

plurality of transition networks formed for each word included in the input speech by use of standard phonetic segment sequence;

means for passing the extracted phonetic segment likelihood sequence through said transition networks by referring to a selectively scored value obtained in said scoring means for performing word-by-word matching; and

means for continuously combining results of the word-by-word matching to obtain recognition outputs of the input speech.

4,888,824

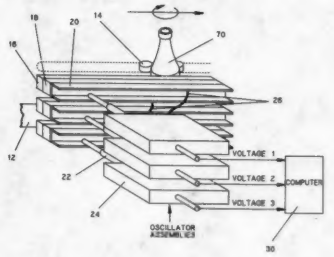
GLASS CONTAINER WALL THICKNESS INSPECTING MACHINE

Robert P. Andersen, Monroe; Paul F. Scott, Hartford, both of Conn., and Edward F. Vozenilek, Elmira, N.Y., assignors to Emhart Industries Inc., Farmington, Conn.

Filed Oct. 5, 1988, Ser. No. 253,828

Int. Cl.[4] **G01R** *27/26*

U.S. Cl. 324—61 R **2 Claims**



1. A machine for inspecting the wall thickness of a glass container comprising:

capacitance sensing means;

means for presenting an portion of the wall of a glass container to said capacitance sensing means;

measuring oscillator means for generating a periodic voltage representative of the sensed capacitance;

means for generating a periodic voltage representative of the wall thickness of the glass container including a phase locked loop having:

a voltage controlled reference oscillator,

phase detector means,

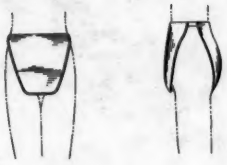
the output of said measuring and voltage controlled reference oscillators being inputted to said phase detector means, and

said output of said phase detector means being applied to said voltage controlled reference oscillator so that said reference and measuring oscillators will operate at the same frequencies whereby the voltage input to said voltage controlled reference oscillator will be representative of the thickness of the wall of the glass container.

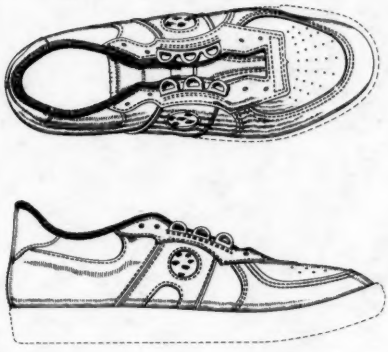
DESIGNS

DECEMBER 19, 1989

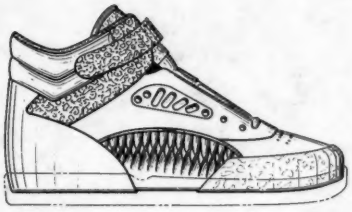
305,075
UNDERWEAR FOR MEN
Tadashi Ichikawa, 22, Kasuga-cho, Gifu-shi, Gifu-ken, Japan
Continuation-in-part of Ser. No. 846,709, Apr. 1, 1986, Pat. No. 4,702,239. This application Dec. 2, 1986, Ser. No. 937,122
Claims priority, application Japan, Apr. 3, 1985, 60-71400
Term of patent 14 years
U.S. Cl. D2—11



305,076
SPORT SHOE UPPER
Kevin Crowley, Brentwood, N.H., assignor to Wilson Sporting Goods Co., River Grove, Ill.
Filed Jan. 20, 1987, Ser. No. 5,451
Term of patent 14 years
U.S. Cl. D2—314



305,077
FOR SHOE UPPER
Kimberly A. McKinstry, Redondo Beach, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Mar. 15, 1989, Ser. No. 323,988
Term of patent 14 years
U.S. Cl. D2—314



305,078
BACKPACK-TYPE CARRIER FOR PORTABLE OXYGEN DISPENSERS
Ann A. Moore, 1150 Colorado Hwy. 74, Evergreen, Colo. 80439, assignor to Ann A. Moore; Michael C. Moore and Leslie Becuparlant, all of Evergreen, Colo.
Filed Apr. 24, 1986, Ser. No. 857,607
Term of patent 14 years
U.S. Cl. D3—32

305,079

CASE FOR MAGNIFYING GLASS OR THE LIKE

Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 229,030

Term of patent 14 years

U.S. Cl. D3—33

305,080

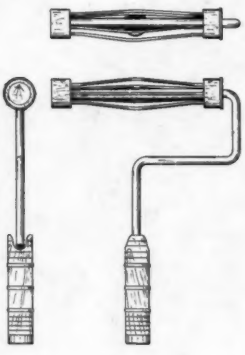
PAINT ROLLER FRAME

Virgil G. Morgan, Goshen; Sharon J. Denton, and Wallace Morgan, both of Huntington, all of Ind., assignors to MDM Products, Huntington, Ind.

Filed Jun. 1, 1987, Ser. No. 55,867

Term of patent 14 years

U.S. Cl. D4—122



305,081

COMBINED ADJUSTABLE CHAIR AND OTTOMAN UNIT

Raymond Grosfillex, Arbent, 01107 Oyonnax, France

Filed Aug. 11, 1986, Ser. No. 895,359

Claims priority, application France, Feb. 11, 1986, 860,665

The portion of the term of this patent subsequent to Jan. 10, 2003, has been disclaimed.

Term of patent 14 years

U.S. Cl. D6—361

305,082

CHAIR

Johan Ullman, Anestadsgatan 3, S-582 58 Linköping, Sweden

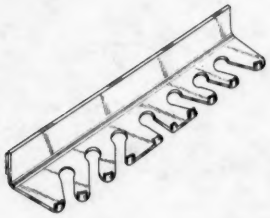
Division of Ser. No. 725,097, Apr. 19, 1985, abandoned. This application Jun. 30, 1988, Ser. No. 214,155

Claims priority, application Switzerland, Oct. 19, 1984, 84-2803

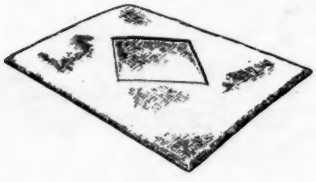
Term of patent 14 years

U.S. Cl. D6—366

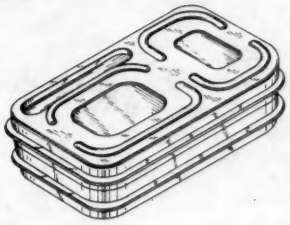
305,083
RAZOR ORGANIZER
William M. White, P.O. Box 573, Waycross, Ga. 31501
Filed Jul. 13, 1987, Ser. No. 72,592
Term of patent 14 years
U.S. Cl. D6—526



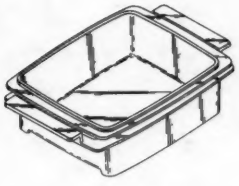
305,084
COVER FOR A COMFORTER
Sally L. Gyebnar, 5383 Lewis Ave., Coleman Village Lot #167, Toledo, Ohio 43612
Continuation of Ser. No. 940,075, Dec. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 606,363, May 2, 1984, abandoned. This application Aug. 4, 1988, Ser. No. 228,962
Term of patent 14 years
U.S. Cl. D6—601



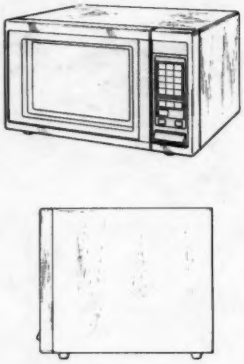
305,085
COMBINED INSULATED FOOD SERVICE TRAY AND COVER
Edgar Otto, Watchung, N.J., assignor to Therma-Systems Corporation, South Plainfield, N.J.
Filed Nov. 24, 1986, Ser. No. 934,314
Term of patent 14 years
U.S. Cl. D7—16



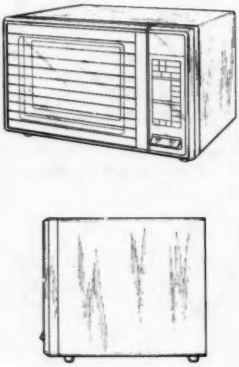
305,086
COMBINED COOKING AND STORAGE CONTAINER
James B. Stewart, Randolph, N.J., assignor to Farberware Inc., Bronx, N.Y.
Filed Apr. 4, 1986, Ser. No. 847,899
Term of patent 14 years
U.S. Cl. D7—21



305,087
MICROWAVE OVEN
Masuo Ichihara; Kensuke Mizuma; Masayoshi Kubo; Hisayoshi Matoba, all of Nara, and Katsutoshi Kido, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 22, 1987, Ser. No. 64,495
Claims priority, application Japan, Jan. 30, 1987, 62-3586
Term of patent 14 years
U.S. Cl. D7—351



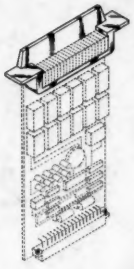
305,088
MICROWAVE OVEN
Katsutoshi Kido, Kyoto; Masayoshi Kubo, Nara; Hisayoshi Matoba, Nara; Masuo Ichihara, Nara, and Kensuke Mizuma, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 22, 1987, Ser. No. 64,496
Claims priority, application Japan, Jan. 30, 1987, 62-3582
Term of patent 14 years
U.S. Cl. D7—351



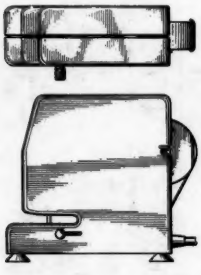
305,089
SOLAR TEA STIRRER
Marion E. Thompson, Colorado Springs, Colo., assignor to Shirley Albeck, Canoga Park, Calif.
Filed Jan. 9, 1987, Ser. No. 1,997
Term of patent 14 years
U.S. Cl. D7—379

305,090
PRUNER HANDLE ASSEMBLY
Walter W. Collins, North, S.C.; Roy B. Bendickson, Merrill, and Robert A. Seaton, Wausau, both of Wis., assignors to Fiskars Oy Ab, Helsinki, Finland
Filed Aug. 3, 1988, Ser. No. 227,982
Term of patent 14 years
U.S. Cl. D8—4

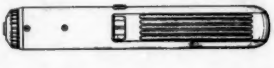
305,091
HANDLE FOR MANIPULATING A PRINTED CIRCUIT BOARD OR THE LIKE
John M. Klebba, Golden, Colo., assignor to Geomation, Inc., Golden, Colo.
Filed Aug. 14, 1986, Ser. No. 896,678
Term of patent 14 years
U.S. Cl. D8—14



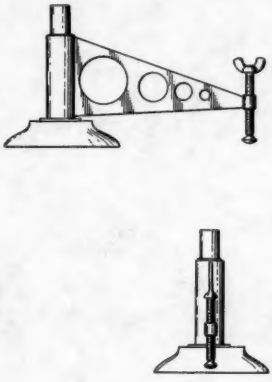
305,092
COMPACT POWER STAPLER
Paul Olesen, Bellmore, and Jon Chester, New York, both of N.Y., assignors to Swingline Inc., Long Island City, N.Y.
Filed Mar. 3, 1986, Ser. No. 833,493
Term of patent 14 years
U.S. Cl. D8—49



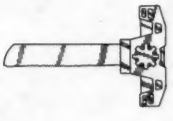
305,093
PORTABLE ELECTRIC DRIVER
Kiyoshi Hoshino, and Toshiaki Saito, both of Tokyo, Japan, assignors to Ryobi Ltd., Tokyo, Japan
Filed Nov. 19, 1986, Ser. No. 932,535
Claims priority, application Japan, May 27, 1986, 61-20438
Term of patent 14 years
U.S. Cl. D8—61



305,094
CLAMP FOR AUTOMOBILE WINDOW REPAIR
Jimmy D. McDonald, 15890 E. 14th St., San Leandro, Calif. 94578
Filed Feb. 13, 1987, Ser. No. 14,651
Term of patent 14 years
U.S. Cl. D8—72

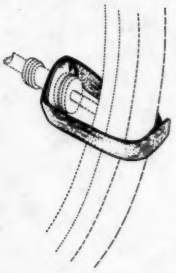


305,095
HAND SAW
Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Osaki, Japan
Filed Jul. 7, 1987, Ser. No. 70,514
Claims priority, application Japan, Nov. 15, 1986, 61-045145
Term of patent 14 years
U.S. Cl. D8—95

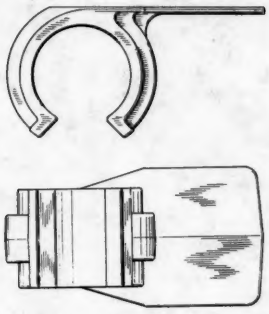


305,096
RETRACTABLE BLADE KNIFE
Wallace Tench; Christopher Collins; Cvetan Petroff, all of South Yarra, and Gordon Bremmer, Olinda, all of Australia, assignors to McPherson's Limited, Australia
Filed May 11, 1987, Ser. No. 48,391
Claims priority, application Australia, Nov. 12, 1986, 7431/86
Term of patent 14 years
U.S. Cl. D8—99

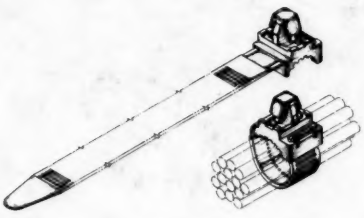
305,097
CINCH FOR HOLDING A PNEUMATIC PUMP HEAD ONTO A TIRE VALVE
Rhea P. Converse, 1341 Witham Dr., Dunwoody, Ga. 30338
Filed Jan. 5, 1987, Ser. No. 960
Term of patent 14 years
U.S. Cl. D8—394



305,098
BACK PACK FRAME CLIP
William G. Crowle, Deerfield, and Mark J. Udelhofen, Park Ridge, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.
Filed Mar. 2, 1987, Ser. No. 20,689
Term of patent 14 years
U.S. Cl. D8—395



305,099
CLAMPING STRAP FOR ELECTRICAL WIRES
Koji Naruse; Mamoru Ono, and Toshio Okazaki, all of Toyota, Japan, assignors to Yazaki Corporation, Japan
Filed Nov. 9, 1987, Ser. No. 118,624
Term of patent 14 years
U.S. Cl. D8—396



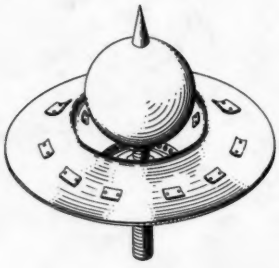
305,100
WATCH BAND MEDICATION CONTAINER
Robert E. Paulin, 2575 E. Thompson Rd., Langley, Wash. 98260
Filed Jul. 24, 1986, Ser. No. 888,985
Term of patent 14 years
U.S. Cl. D9—324

305,101
BOX OR THE LIKE
Stig Winterling, Yrsnögränd 4, S-126 57 Hägersten, Sweden
Filed Oct. 23, 1985, Ser. No. 790,500
Claims priority, application Sweden, Apr. 24, 1985, 85-1074
Term of patent 14 years
U.S. Cl. D9—416

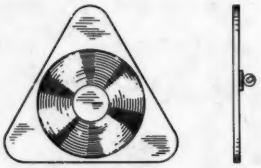
305,102
CAP FOR TUBE TYPE DISPENSERS
Kenneth A. Olson, 16414 Brookford, Houston, Tex. 77059
Filed Jun. 30, 1986, Ser. No. 880,499
Term of patent 14 years
U.S. Cl. D9—440

305,103
SCALE
Stephen E. Kennedy, Cape Province, South Africa, assignor to Coinmaster (Proprietary) Limited, Cape Town, South Africa
Filed Feb. 18, 1986, Ser. No. 834,041
Claims priority, application South Africa, Aug. 19, 1985, 85/0738
Term of patent 14 years
U.S. Cl. D10—91

305,104
LIGHTNING ARRESTER
Kenneth P. Heary, Springville, N.Y., assignor to Heary Bros. Lightening Protection Co., Inc., Springville, N.Y.
Filed Apr. 1, 1987, Ser. No. 32,701
Term of patent 14 years
U.S. Cl. D10—105

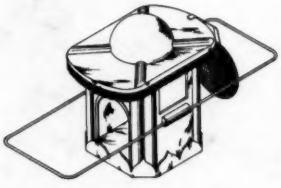


305,105
LAPEL BUTTON
Robert J. De Brey, 4502 Browndale Ave., Edina, Minn. 55424
Filed Jul. 16, 1987, Ser. No. 74,013
Term of patent 14 years
U.S. Cl. D11—99

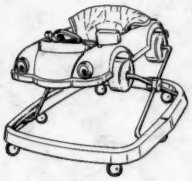


305,106
SLIDER FOR SLIDE FASTENER
Tsunetaka Aoki, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan
Filed Oct. 26, 1987, Ser. No. 112,427
Term of patent 14 years
U.S. Cl. D11—221

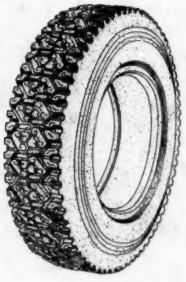
305,107
PALANQUIN
Shenq Y. Lin, No. 335, Sec. 1, Her Tsuoh Road, Homei Chen, Chang Hwa, Taiwan
Filed Sep. 18, 1986, Ser. No. 909,073
Term of patent 14 years
U.S. Cl. D12—1



305,108
WALKER
Martin Blumenthal, Chatham, N.J., assignor to Century Products Company, Macedonia, Ohio
Filed Aug. 28, 1987, Ser. No. 90,644
Term of patent 14 years
U.S. Cl. D12—130

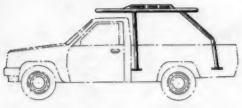


305,109
VEHICLE TIRE
Kevin Niderost, Henley-in-Arden, England, assignor to SP Tyres UK Ltd., Birmingham, United Kingdom
Filed Jul. 31, 1986, Ser. No. 891,330
Claims priority, application United Kingdom, Feb. 22, 1986, 1032443
Term of patent 14 years
U.S. Cl. D12—146

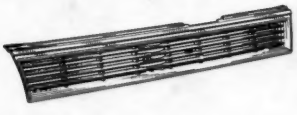


305,110
VEHICLE TIRE
Masaaki Minamitani, Osaka, Japan, assignor to The Ohtsu Tire & Rubber Co., Ltd., Osaka, Japan
Filed Apr. 13, 1987, Ser. No. 38,268
Claims priority, application Japan, Nov. 26, 1986, 61-46937
Term of patent 14 years
U.S. Cl. D12—147

305,111
COMBINED ROLL BAR AND CARRIER
George T. Zagner, 3221 S. Lowell St., Santa Ana, Calif. 92707
Filed Dec. 10, 1987, Ser. No. 131,384
Term of patent 14 years
U.S. Cl. D12—156

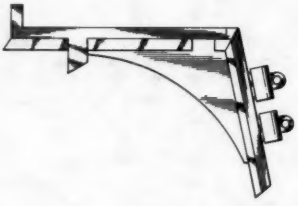


305,112
RADIATOR GRILLE FOR AN AUTOMOBILE
Kazumi Fukagawa, Tokyo, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan
Filed May 13, 1987, Ser. No. 49,088
Term of patent 14 years
U.S. Cl. D12—163

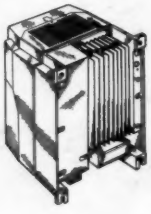


305,113
FRONT SPLASH GUARD FOR BICYCLES
Arsenio E. Paduganan, #6 Randall Rd., Salimas, Calif. 93909
Filed Jul. 7, 1987, Ser. No. 70,520
Term of patent 14 years
U.S. Cl. D12—186

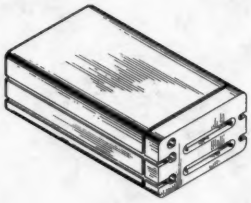
305,114
REAR SPLASH GUARD FOR BICYCLES
Arsenio E. Paduganan, #6 Randall Rd., Salimas, Calif. 93909
Filed Jul. 7, 1987, Ser. No. 70,522
Term of patent 14 years
U.S. Cl. D12—186



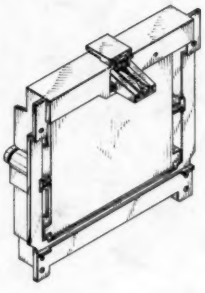
305,115
POWER INVERTER
Nobuyuki Kondo; Yoshinori Abe, both of Kamakura; Hideaki Tata, Nagoya; Fiji Ito, Nagoya; Katsuhiko Chonan, Nagoya, and Hideo Iinuma, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Division of Ser. No. 740,323, Jun. 3, 1985, Pat. No. D. 299,334.
This application Oct. 21, 1988, Ser. No. 260,902
Claims priority, application Japan, Dec. 3, 1984, 59-49660; Dec. 3, 1984, 59-49662; Dec. 3, 1984, 59-49663; Dec. 3, 1984, 59-49664
Term of patent 14 years
U.S. Cl. D13—4



305,116
DUAL INTEGRATED CIRCUIT CARD READER/WRITER
George Schmidt, Douglaston, N.Y., assignor to Personal Computer Card Corporation, New York, N.Y.
Filed Mar. 25, 1988, Ser. No. 174,315
Term of patent 14 years
U.S. Cl. D14—105



305,117
CASSETTE HOLDER FOR USE IN A COMPUTER
Toru Masuda, Higashi-Osaka, and Norio Ichitsubo, Yao, both of Japan, assignors to Hosiden Electronics Co., Ltd., Yao, Japan
Filed Feb. 11, 1986, Ser. No. 828,420
Claims priority, application Japan, Oct. 12, 1985, 60-42779
Term of patent 14 years
U.S. Cl. D14—114



305,118

COMBINATION WIRELESS HANDSET TELEPHONE AND SPEAKER/DIAL STAND THEREFOR

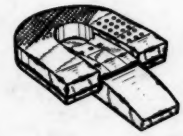
Herbert Pfeifer, Campbell, and Paul Montgomery, San Francisco, both of Calif., assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Aug. 16, 1988, Ser. No. 232,882

Claims priority, application Rep. of Korea, Apr. 19, 1988, 1988-5293

Term of patent 14 years

U.S. Cl. D14—138



305,119

COMBINATION WIRELESS HANDSET TELEPHONE AND SPEAKER STAND THEREFOR

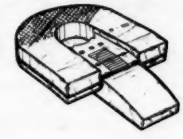
Herbert Pfeifer, Campbell, and Paul Montgomery, San Francisco, both of Calif., assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Aug. 16, 1988, Ser. No. 232,880

Claims priority, application Rep. of Korea, Apr. 19, 1988, 1988-5292

Term of patent 14 years

U.S. Cl. D14—142



305,120

COMBINATION HANDSET TELEPHONE AND STAND THEREFOR

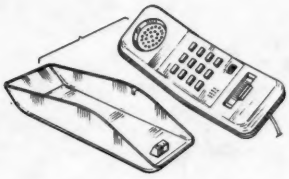
Massimo Gariano, Milan, Italy, assignor to Progress Consultant S.r.l., Milan, Italy

Filed Oct. 3, 1988, Ser. No. 252,712

Claims priority, application Italy, Apr. 6, 1988, 210225/88[U]

Term of patent 14 years

U.S. Cl. D14—148



305,121

HANDS-FREE INTERCOMMUNICATION INSTRUMENT

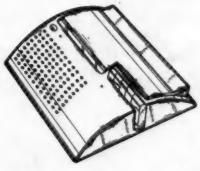
Herbert Pfeifer, Campbell; Paul Montgomery, San Francisco, and Dan Sturges, Campbell, all of Calif., assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

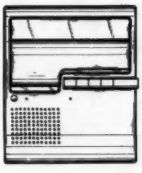
Filed Aug. 16, 1988, Ser. No. 232,886

Claims priority, application Rep. of Korea, Apr. 19, 1988, 1988-5291

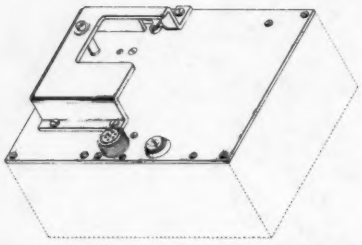
Term of patent 14 years

U.S. Cl. D14—159

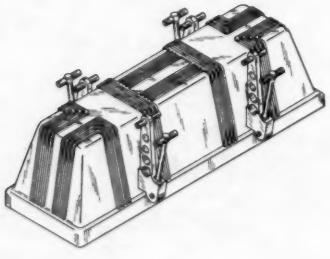




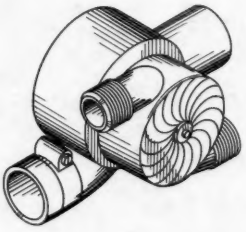
305,122
FRONT PANEL FOR A DATA RECORDER
Steven L. Swartz, Franklin County, Pa., assignor to Pulse Electronics, Inc., Rockville, Md.
Filed Sep. 18, 1986, Ser. No. 909,075
Term of patent 14 years
U.S. Cl. D14—257



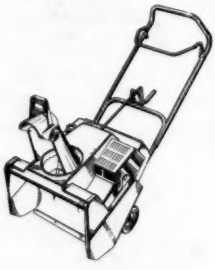
305,123
QUICK RELEASE VALVE COVER ASSEMBLY
Terry L. Garrett, 8312 E. 11th St., Tulsa, Okla. 74127, and Richard P. Brumbaugh, Jr., Rte. 2, Box 958, Manford, Okla. 74044
Filed Aug. 4, 1987, Ser. No. 81,179
Term of patent 14 years
U.S. Cl. D15—5



305,124
GAS DRIVEN WATER PUMP
Wilfried Singhoff, c/o Augusto Villatoro, 1414 Euclid Ave., Apt. #20, Miami Beach, Fla. 33139
Filed Sep. 18, 1987, Ser. No. 98,126
Term of patent 14 years
U.S. Cl. D15—7



305,125
SNOWTHROWER
Darrell W. Hinklin, Richfield, Minn., assignor to The Toro Company, Minneapolis, Minn.
Filed Aug. 28, 1986, Ser. No. 902,329
Term of patent 14 years
U.S. Cl. D15—11



305,126

CONTROL PANEL FOR A SEWING MACHINE

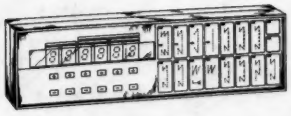
Yutaka Yamaura; Takashi Nakamura; Satomi Yamauchi, all of Nagoya, and Yoshinori Abe, Kanagawa, all of Japan, assignors to Mitsubishi Electric Corporation, Tokyo, Japan

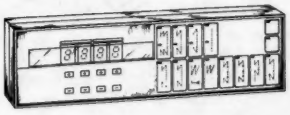
Filed Jul. 15, 1986, Ser. No. 885,616

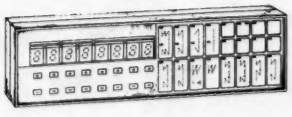
Claims priority, application Japan, Jan. 16, 1986, 61-1087; Jan. 16, 1986, 61-1088; Jan. 16, 1986, 61-1090; Jan. 16, 1986, 61-1091

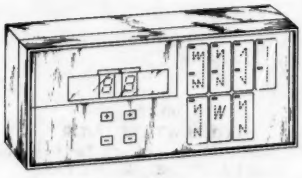
Term of patent 14 years

U.S. Cl. D15—72









305,127

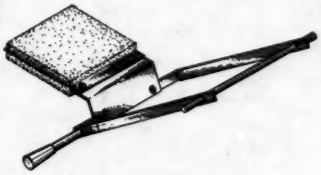
PAD FOR A HEAT SEAL MACHINE

Peter R. Lippman, Bedford Hills, N.Y., assignor to Penn Emblem Co., Philadelphia, Pa.

Filed Apr. 23, 1987, Ser. No. 41,792

Term of patent 14 years

U.S. Cl. D15—146



305,128

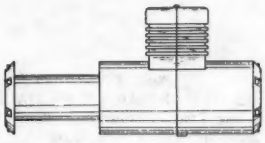
TELESCOPE

Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 229,028

Term of patent 14 years

U.S. Cl. D16—132



305,129

GUITAR

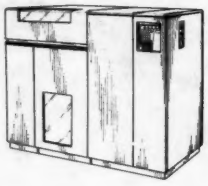
Steven S. Vai, 13381 Fellows Ave., Sylmar, Calif. 91342

Filed Dec. 31, 1986, Ser. No. 948,300

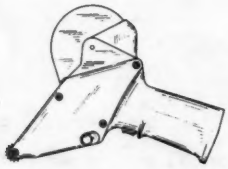
Term of patent 14 years

U.S. Cl. D17—14

305,130
LINE PRINTER FOR A COMPUTER
Rikio Ohtani; Yasuyuki Tsuji; Kimio Nakamura; Kazuyuki Kubo; Takao Chikuzenya, and Osamu Nishino, all of Ibaragi, Japan, assignors to Hitachi Koki Co., Ltd., Tokyo, Japan
Filed Sep. 5, 1986, Ser. No. 904,312
Claims priority, application Japan, Mar. 14, 1986, 61-9353
Term of patent 14 years
U.S. Cl. D18—13

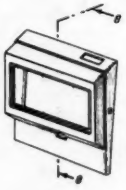


305,131
LABEL PRINTER AND APPLYING MACHINE
Yo Sato, Tokyo, and Tadao Kashiwaba, Iwate, both of Japan, assignors to Kabushiki Kaisha Sato, Japan
Filed Feb. 10, 1986, Ser. No. 828,234
Claims priority, application Japan, Oct. 16, 1985, 60-43043
Term of patent 14 years
U.S. Cl. D18—19

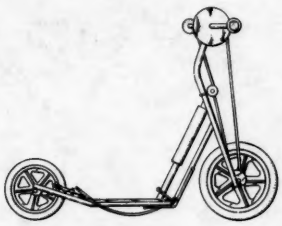


305,132
FLEXIBLE CLIP
Avi Ruimi, Tarzana, Calif., assignor to Auto-Shade, Inc., North Hollywood, Calif.
Filed Jul. 1, 1986, Ser. No. 881,011
Term of patent 14 years
U.S. Cl. D19—65

305,133
SLOT MACHINE DOOR
Leroy H. Gutknecht, 2607 S. Highland, Las Vegas, Nev. 89109
Filed Feb. 27, 1987, Ser. No. 19,953
Term of patent 14 years
U.S. Cl. D21—38



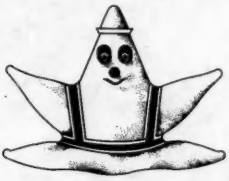
305,134
HAND POWERED SCOOTER
Hugo Rubio, North Hollywood; Mohammad Riaz, Moorpark, and Bhikhabhai A. Patel, Chatsworth, all of Calif., assignors to Biku Industries, Inc., Sun Valley, Calif.
Filed May 18, 1987, Ser. No. 51,482
Term of patent 14 years
U.S. Cl. D21—81



305,135
FOLDING TOY RACETRACK
Tat K. Ng, Hong Kong, Hong Kong, assignor to Artin Industrial Co., Ltd., Kowloon, Hong Kong
Filed Jan. 29, 1987, Ser. No. 8,429
Claims priority, application United Kingdom, Nov. 12, 1986, 1038002
Term of patent 14 years
U.S. Cl. D21—143

305,136
STUFFED MAPLE LEAF TOY FIGURE
Gerald A. Blasiman, P.O. Box 825, Salem, Ohio 44460
Filed Jan. 30, 1987, Ser. No. 9,132
Term of patent 14 years
U.S. Cl. D21—155

305,137
STUFFED SWEET GUM LEAF TOY FIGURE
Gerald A. Blasiman, P.O. Box 825, Salem, Ohio 44460
Filed Jan. 30, 1987, Ser. No. 9,133
Term of patent 14 years
U.S. Cl. D21—155



305,138
STUFFED OAK LEAF TOY FIGURE
Gerald A. Blasiman, P.O. Box 825, Salem, Ohio 44460
Filed Jan. 30, 1987, Ser. No. 9,134
Term of patent 14 years
U.S. Cl. D21—155

305,139
STUFFED TULIP LEAF TOY FIGURE
Gerald A. Blasiman, P.O. Box 825, Salem, Ohio 44460
Filed Jan. 30, 1987, Ser. No. 9,135
Term of patent 14 years
U.S. Cl. D21—155

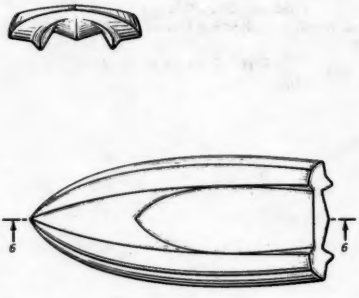
305,140
TOY POLAR BEAR OR THE LIKE
Robert F. Bateman, Greenville; Brian L. Newton, Woonsocket; Martin J. Wolff, North Providence, all of R.I.; John R. Nottingham, and John W. Spirk, both of Moreland Hills, Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 16, 1986, Ser. No. 886,717
Term of patent 14 years
U.S. Cl. D21—159

305,141
TOY LION OR THE LIKE
Robert F. Bateman, Greenville; Brian L. Newton, Woonsocket; Martin J. Wolff, North Providence, all of R.I.; John R. Nottingham, and John W. Spirk, both of Moreland Hills, Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 16, 1986, Ser. No. 886,714
Term of patent 14 years
U.S. Cl. D21—163

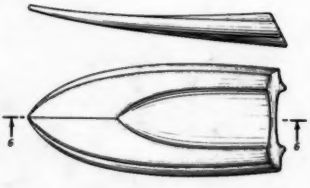
305,142
TOY GIRAFFE OR THE LIKE
Robert F. Bateman, Greenville; Brian L. Newton, Woonsocket; Martin J. Wolff, North Providence, all of R.I.; John R. Nottingham, and John W. Spirk, both of Moreland Hills, Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 16, 1986, Ser. No. 886,715
Term of patent 14 years
U.S. Cl. D21—164

305,143
TWO WHEEL ROLLER SKATE
Jiajiu Shaw, P.O. Box 920, Washington Grove, Md. 20880
Filed May 26, 1987, Ser. No. 54,007
Term of patent 14 years
U.S. Cl. D21—226

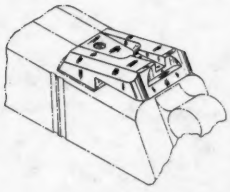
305,144
BODYSURFING BOARD
Dennis A. Shanelec, 1515 State St., Ste. 1, Santa Barbara, Calif. 93101
Filed Feb. 22, 1988, Ser. No. 158,992
Term of patent 14 years
U.S. Cl. D21—228



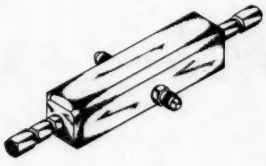
305,145
BODYSURFING BOARD
Dennis A. Shanelec, 1515 State St., Suite 1, Santa Barbara, Calif. 93101
Filed Feb. 22, 1988, Ser. No. 158,993
Term of patent 14 years
U.S. Cl. D21—228



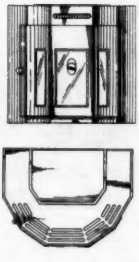
305,146
REAR SIGHT FOR A PISTOL
Wayne F. Novak, 1206½ 30th Street, P.O. Box 4045, Parkersburg, W. Va. 26102
Filed May 21, 1987, Ser. No. 52,765
Term of patent 14 years
U.S. Cl. D22—109



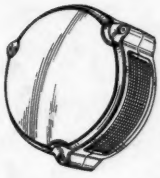
305,147
PAINT SPRAY GUN MANIFOLD ATTACHMENT
Richard A. Samford, 6614 Acorn Hill Rd., Placerville, Calif. 95667
Filed Apr. 18, 1988, Ser. No. 183,033
Term of patent 14 years
U.S. Cl. D23—263



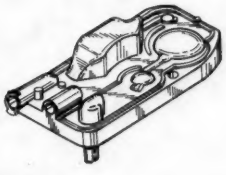
305,148
WOOD PELLET BURNING STOVE
Winston E. Christensen, Arcadia, Calif., assignor to Winston Stove, Inc., Monrovia, Calif.
Filed Oct. 1, 1987, Ser. No. 103,380
Term of patent 14 years
U.S. Cl. D23—343



305,149
MOTORCYCLE AIR CLEANER
Alwin J. Stahel, St. Paul, Minn., assignor to Drag Specialties, Inc., Eden Prairie, Minn.
Filed Feb. 18, 1987, Ser. No. 11,634
Term of patent 14 years
U.S. Cl. D23—364



305,150
INTRAVENOUS PUMP CASSETTE
John Pastrone, Los Gatos, Calif., assignor to Abbott Laborastories, Abbott Park, Ill.
Filed May 1, 1987, Ser. No. 46,051
Term of patent 14 years
U.S. Cl. D24—8



305,151

COMBINED IV TUBE SLIDE CLAMP AND ASSOCIATED PERISTALTIC PUMPING CHAMBER

Jon Bisha', Beaverton, Oreg., assignor to Fisher Scientific Group Inc., San Diego, Calif.

Filed Jan. 6, 1987, Ser. No. 1,085

Term of patent 14 years

U.S. Cl. D24—29

305,152

REVOLVING DOOR

Bok K. Wang, Rm. No. 301, Bldg. No. 7, 274-58, Banpo-dong, Seoul, Rep. of Korea

Filed Apr. 30, 1986, Ser. No. 858,292

Term of patent 14 years

U.S. Cl. D25—48

305,153

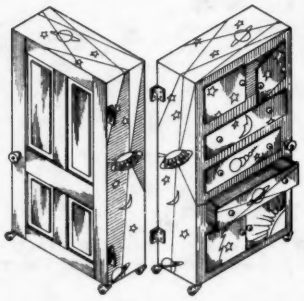
COMBINED DOOR AND STORAGE CHEST OR SIMILAR ARTICLE

Lincoln Elderkin, P.O. Box 877, Richfield Springs, N.Y. 13439

Filed Feb. 2, 1989, Ser. No. 305,210

Term of patent 14 years

U.S. Cl. D25—48



305,154

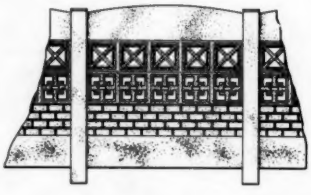
PRECAST CONCRETE WALL

Peter J. Muller, 3650 S. Joplin St.; Charles L. Kellerman, 3405 S. Jasper Ct., both of Aurora, Colo. 80013, and James E. Sirhall, 8158 W. Chestnut Ave., Littleton, Colo. 80123

Filed Sep. 2, 1988, Ser. No. 239,964

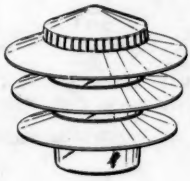
Term of patent 14 years

U.S. Cl. D25—58

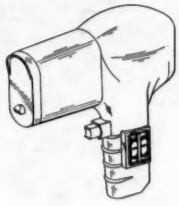


305,155
ADJUSTABLE FLOOR LAMP
Michele De Lucchi, Milan, Italy, assignor to Artemide S.p.A., Milan, Italy
Filed Jul. 6, 1987, Ser. No. 70,832
Claims priority, application Italy, Jan. 8, 1987, 20427/87[U]
The portion of the term of this patent subsequent to Aug. 8, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D26—65

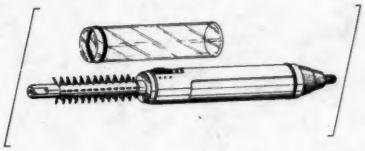
305,156
OUTDOOR LUMINAIRE
William H. Maddock, Markham, Canada, assignor to Noma Inc., Scarborough, Canada
Filed Mar. 19, 1987, Ser. No. 28,148
Term of patent 14 years
U.S. Cl. D26—67



305,157
COMBINED HAIR DRYER AND SPRAYER
Wendy W. Kim, Salt Lake City; Valdon G. Reynolds, Bountiful, and Sherman L. Kendall, Park City, all of Utah, assignors to Sorenson Development, Inc., Salt Lake City, Utah
Filed Sep. 17, 1987, Ser. No. 97,913
Term of patent 14 years
U.S. Cl. D28—15



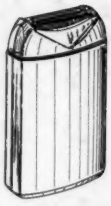
305,158
COMBINED CURLER AND CAP THEREFOR
Rudolf Vackiner, Mörfelden-Wolldorf, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH
Filed Jun. 8, 1987, Ser. No. 59,318
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 5 MR 10736
Term of patent 14 years
U.S. Cl. D28—35



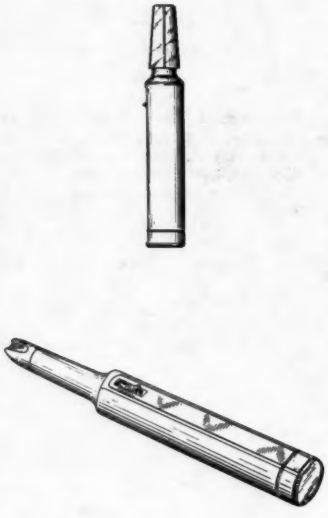
305,159
ELECTRIC DRY SHAVER
Roland Ullmann, Offenbach-Rumpenheim, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany
Filed Nov. 16, 1987, Ser. No. 121,779
Term of patent 14 years
U.S. Cl. D28—49

305,160
DRY SHAVER
Murray I. C. Camens, Singapore, Singapore, assignor to U.S. Philips Corporation, New York, N.Y.
Filed May 21, 1987, Ser. No. 53,433
Claims priority, application Benelux, Dec. 19, 1986, 61700-01
Term of patent 14 years
U.S. Cl. D28—51

305,161
DRY SHAVER
Murray I. C. Camens, Singapore, Singapore, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jun. 18, 1987, Ser. No. 63,615
Claims priority, application Hague, Dec. 19, 1986, 61700-02
Term of patent 14 years
U.S. Cl. D28—51



305,162
COMBINED CLIPPER AND CAP THEREFOR
Robert A. Mockovak, Newton, Conn., assignor to Remington Products, Inc., Bridgeport, Conn.
Filed Mar. 31, 1987, Ser. No. 33,167
Term of patent 14 years
U.S. Cl. D28—53

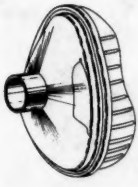


305,163
SCRUB BRUSH
Darlene Shaeffer, 1095 Hillcrest Dr., Kingman, Ariz. 86401
Filed Jul. 16, 1987, Ser. No. 74,464
Term of patent 14 years
U.S. Cl. D28—59

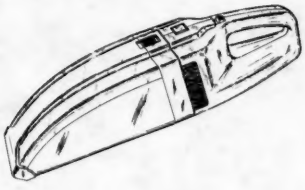
305,164
COMPACT
David C. Hall, Solihull, England, assignor to Laughton & Sons Limited, Birmingham, England
Filed Apr. 23, 1987, Ser. No. 41,359
Claims priority, application United Kingdom, Oct. 23, 1986, 1 037 591
Term of patent 14 years
U.S. Cl. D28—83

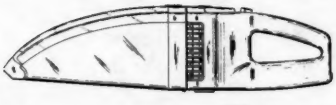
305,165
TWO WAY CHECK RESPIRATORY VALVE
Hans Rudolph, Shawnee Mission, and Kevin Rudolph, Leawood, both of Kans., assignors to Hans Rudolph, Inc., Kansas City, Mo.
Filed Aug. 6, 1987, Ser. No. 82,186
Term of patent 14 years
U.S. Cl. D29—7

305,166
ANESTHESIA AND RESPIRATORY FACE MASK
Jeffrey J. Quinn, and Brad H Quinn, both c/o EMS, P.O. Box 681514, Indianapolis, Ind. 46268
Filed Jul. 13, 1987, Ser. No. 73,206
Term of patent 14 years
U.S. Cl. D29—8



305,167
COMBINATION WET AND DRY VACUUM CLEANER
Robert Case, Chicago; James D. Morrow, Oak Park, and George O. Podd, III, Chicago, all of Ill., assignors to Emerson Electric Co., St. Louis, Mo.
Filed Feb. 24, 1987, Ser. No. 18,071
Term of patent 14 years
U.S. Cl. D32—18

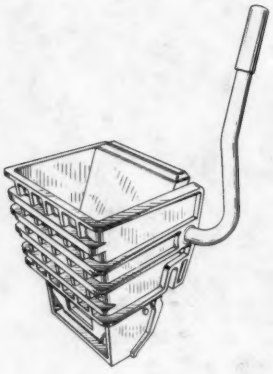




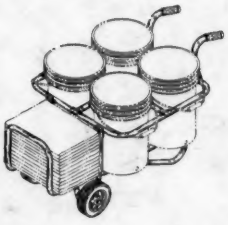
305,168
UPRIGHT VACUUM CLEANER
Clarence P. Kroll, Oceanside, Calif., assignor to Riccar America Company, Tustin, Calif.
Filed Sep. 10, 1987, Ser. No. 94,932
Term of patent 14 years
U.S. Cl. D32—22

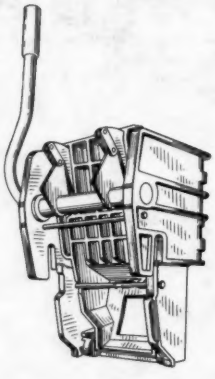
305,169
SUCTION CLEANER HOOD
John D. Essex, and Milton G. Kieft, both of North Canton, Ohio, assignors to The Hoover Company, North Canton, Ohio
Filed Apr. 20, 1987, Ser. No. 40,146
Term of patent 14 years
U.S. Cl. D32—31

305,170
MOP WRINGER
Philip Jaros, Gloversville, and Paul O. Wright, Schenectady, both of N.Y., assignors to White Mop Wringer Company, Tampa, Fla.
Filed Mar. 12, 1987, Ser. No. 24,806
Term of patent 14 years
U.S. Cl. D32—54

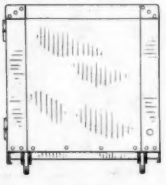


305,171
TRASH CONTAINER CART
Samuel J. Marini, Marlton, N.J., assignor to Cushionite, Inc., Blackwood, N.J.
Filed Nov. 2, 1987, Ser. No. 116,743
Term of patent 14 years
U.S. Cl. D34—6





305,172
HEATED FOOD TRANSPORTING CABINET
Albert Kolvites, Mountaintop; John L. Giungo, Dresher, and Robert J. Cohn, Dallas, all of Pa., assignors to InterMetro Industries Corporation, Wilkes-Barre, Pa.
Filed Sep. 17, 1987, Ser. No. 97,934
Term of patent 14 years
U.S. Cl. D34—19

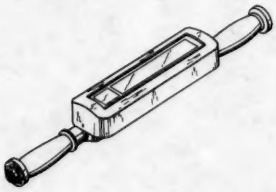


305,173

ELECTRONIC DISPLAY DEVICE FOR SHOPPING CART

Akimasa Nozawa, Yono, Japan, assignor to Nippon Seiki Co., Ltd., Nagaoka, Japan

Filed May 15, 1987, Ser. No. 50,141
Claims priority, application Japan, Nov. 17, 1986, 61-45433
Term of patent 14 years
U.S. Cl. D34—27

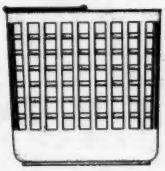


305,174

BASKET

Toshimichi Yoshikawa, Nara, Japan, assignor to Kabushiki Kaisha Yoshikawa Kuni Kogyosho, Nara, Japan

Filed Jul. 9, 1986, Ser. No. 883,836
Claims priority, application Japan, Jan. 13, 1986, 61-798
Term of patent 14 years
U.S. Cl. D34—40



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TO WHOM

PATENTS WERE ISSUED ON THE 19TH DAY OF DECEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. C. Nielsen Company: *See*—
Bohn, Jerry W., 4,888,638, Cl. 358-84.000.

A. E. Staley Manufacturing Company: *See*—
Niekamp, Carl W.; and Seidman, Martin, 4,888,060, Cl. 127-60.000.

A. O. Smith Corporation: *See*—
Kerecman, Norman C., 4,887,989, Cl. 464-180.000.

Aarding Non Ferro Werk B.V.: *See*—
den Hartog, Gerardus J. H., 4,887,970, Cl. 439-92.000.

AB Carbogel: *See*—
Mathiesen, Mait M.; Gillberg, Lars I.; Hellsten, Karl M. E.; and Karlsson, Gunvor B. T., 4,887,383, Cl. 44-51.000.

Abare, Wayne: *See*—
Kumar, Prithvi R.; and Abare, Wayne, 4,888,675, Cl. 363-47.000.

ABB Atom AB: *See*—
Vesterlund, Gunnar, 4,888,150, Cl. 376-333.000.

Abe, Atsushi: *See*—
Kuwata, Jun; Fujita, Yosuke; Tohda, Takao; Abe, Atsushi; and Matsuoka, Tomizo, 4,888,246, Cl. 428-432.000.

Abe, Masayoshi: *See*—
Yamazaki, Shunpei; Suzuki, Kunio; Nagayama, Susumu; Inujima, Takashi; Abe, Masayoshi; Fukada, Takeshi; Kinka, Mikio; Kobayashi, Ippei; Shibata, Katsuhiko; Susukida, Masato; and Koyanagi, Kaoru, 4,888,305, Cl. 437-101.000.

Abe, Seiko: *See*—
Igashira, Toshihiko; Sakakibara, Yasuyuki; Abe, Seiko; Sekiguchi, Kiyonori; Izawa, Akihiro; and Kawai, Hisasi, 4,887,569, Cl. 123-300.000.

Abe, Shinya: *See*—
Yamatsu, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Murakami, Manabu; Oketani, Kiyoshi; and Fujisaki, Hideaki, 4,888,439, Cl. 560-129.000.

Abe, Shunichi, to Canon Kabushiki Kaisha. Image reproducing system. 4,888,636, Cl. 358-80.000.

Abe, Shunji, to Yamaichi Electric Mfg. Co., Ltd. IC socket. 4,887,969, Cl. 439-73.000.

Abe, Toshiro: *See*—
Fujiwara, Yasuhiko; Abe, Toshiro; Hashimoto, Atsunori; Nakazawa, Shinsuke; Nagano, Masami; and Atago, Takeshi, 4,887,573, Cl. 123-422.000.

Abe, Yasunao: *See*—
Okamoto, Eisaku; and Abe, Yasunao, 4,887,504, Cl. 84-715.000.

Abiomed, Inc.: *See*—
Kung, Robert T. V.; and Singh, Param I., 4,888,011, Cl. 623-3.000.
Lederman, David M.; Singh, Param I.; and Strohl, Clair L., Jr., 4,888,009, Cl. 623-2.000.

Aboelfotoh, Mohamed O.; and Tsang, Yuk L., to International Business Machines Corporation. Process for making a contact structure including polysilicon and metal alloys. 4,888,297, Cl. 437-41.000.

Abraham, Donald J.; and Kennedy, Paul E., to University of Pittsburgh. Method of treating sickle cell anemia. 4,887,995, Cl. 604-4.000.

Abraham, Tim. Floating beverage carrier with collapsible portions. 4,887,716, Cl. 206-427.000.

Abrams, Sonja M. J.; and Vervoort, Robert V. A., to Du Pont de Nemours, E. I., and Company. High solids solvent-based polyester coating composition. 4,888,372, Cl. 524-197.000.

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Abriou, Daniel: *See*—
Tangari, Celia M.; Dugast, Alain; and Abriou, Daniel, 4,887,791, Cl. 249-115.000.

Abuyama, Yasuo, to Kabushiki Kaisha Toshiba. Image forming apparatus with function of auto error correction for optical system. 4,888,650, Cl. 358-451.000.

Academy of Applied Science: *See*—
Bartelink, E. H. B., 4,888,660, Cl. 361-49.000.

Acampora, Alfonse A.; and Bunting, Richard M., to General Electric Company. Refresh system for digital signals. 4,888,640, Cl. 358-133.000.

AcroMed Corporation: *See*—
Heinig, Charles F.; Asher, Marc A.; and Strippgen, Walter E., 4,887,595, Cl. 606-61.000.

Adachi, Hiromitsu: *See*—
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Adam, Peter; Hoffmann, Ferdinand; and Rub, Michael, to Siemens Aktiengesellschaft. Clamping plate for the retention of self-aligning friction bearing. 4,887,916, Cl. 384-192.000.

Adam, Peter; Lindner, Adolf; Schilling, Werner; and Wehner, Ewald, to Siemens Aktiengesellschaft. Device and procedure to adjust the axial play between the rotor and the stator mounted bearings of an electrical motor. 4,888,508, Cl. 310-42.000.

Adams, Anthony L., to Texas Instruments Incorporated. Method for making matrix lead frame. 4,887,352, Cl. 29-827.000.

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Mason, James R.; and Adams, Michael A., 4,888,173, Cl. 424-195.100.

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Adeka Argus Chemical Co., Ltd.: *See*—
Tajima, Kenji; Tsuboi, Tetsuo; and Arata, Ryozo, 4,888,371, Cl. 524-120.000.

Adenau, Marvin L., to Thomas A. Schutz Co., Inc. Dispensing device with sensory alert. 4,887,737, Cl. 221-3.000.

Adolph Coors Company: *See*—
Ditto, James W.; and Jensen, James W., 4,888,717, Cl. 364-559.000.

Advanced Micro Devices, Inc.: *See*—
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,888,731, Cl. 365-49.000.

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Bernard, Esparbes, 4,887,558, Cl. 123-58.00C.

Aftco Mfg. Co., Inc.: *See*—
Shedd, William D.; and Stotesbury, Gregory S., 4,887,375, Cl. 43-21.200.

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Zangenfeind, Helmut; and Wurfel, Reinhart, 4,888,613, Cl. 355-41.000.

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De Rycke, Gino L., 4,888,267, Cl. 430-206.000.

Ahlemeyer, William B.; McCormick, Ben F., II; and Crum, Stephen T., to Uniden America Corporation. Scanning radio receiver. 4,888,815, Cl. 455-168.000.

Aiba, Masaaki: *See*—
Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.

Air-Lec Industries, Inc.: *See*—
Gregerson, Glen M.; Lunenschloss, John T.; Ebbott, Henry M.; and Beckeman, Raymond A., 4,887,954, Cl. 414-401.000.

Air Products and Chemicals, Inc.: *See*—
Brian, Barry W., 4,888,162, Cl. 423-574.00R.
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AirSystems Inc.: *See*—
Lemaster, Milton R.; and Kemp, Norman H., 4,887,533, Cl. 101-492.000.

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Nishii, Michiharu; Mizuno, Genji; Tada, Yoshihiko; Nomura, Yoshihisa; Kato, Masahiko; Shirai, Kenji; and Tanoue, Junichi, 4,887,869, Cl. 303-114.000.

Aizawa, Masanori: *See*—
Matsubayashi, Hiroshi; Aizawa, Masanori; Watanabe, Michio; Shimizu, Takashi; and Ikegami, Tamotsu, 4,887,732, Cl. 220-90.600.

Akada, Yasuaki: *See*—
Hamada, Masataka; Ishida, Tokuji; and Akada, Yasuaki, 4,888,609, Cl. 354-402.000.

Akagi, Terumi, to Aoyama Gankyo Kabushiki Kaisha. Handy Spectacles. 4,887,896, Cl. 351-63.000.

Akamatsu, Takahiro: *See*—
Nakazato, Hiroshi; Matsumura, Takashi; Akamatsu, Takahiro; and Fukui, Kenji, 4,887,904, Cl. 356-375.000.

Akamatsu, Takayoshi: *See*—
Oka, Tetsuo; Hayashi, Kenji; Akamatsu, Takayoshi; and Horiuchi, Satoshi, 4,888,211, Cl. 427-130.000.

Akashi, Fumio: *See*—
Furuya, Yukitsuna; and Akashi, Fumio, 4,888,767, Cl. 370-95.200.

Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, to Nissan Motor Company, Limited. Actively controlled automotive suspension system with acceleration and angular velocity dependent anti-pitching and/or anti-rolling feature. 4,888,696, Cl. 364-424.050.

Akebono Brake Industry Co., Ltd.: *See*—
Kanai, Tamotsu; and Hayashi, Katsunori, 4,887,449, Cl. 72-356.000.

Akira, Toshiaki: *See*—
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.

Akiyoshi, Yasushi: *See*—
Sukimoto, Minobu; Yamazaki, Katsumi; Hirunuma, Naohisa; Taguchi, Seijiro; Usui, Tadashi; Akiyoshi, Yasushi; Nogami, Toyoichiro; and Kaneko, Toyoji, 4,887,557, Cl. 123-52.0MC.

Al-Mar Precision Co.: *See*—
Bonewicz, Theodore J., Jr.; and Leichter, Henry S., 4,887,837, Cl. 280-654.000.

Albrecht, David E. Adapter fitting. 4,887,850, Cl. 285-137.100.

Albrecht, Helen J.: *See*—
Wiley, Michael J.; Albrecht, Helen J.; and Dale, Albie A., 4,887,593, Cl. 606-45.000.

Alcan International Limited: *See*—
Keefer, Richard M., 4,888,459, Cl. 219-10.55E.
Suzuki, Masamichi; Sano, Tadaaki; Suzuki, Toshihiro; and Tanaka, Tsunehiko, 4,888,218, Cl. 427-383.900.

Alcatel N.V.: *See*—
Sevenhans, Joannes M. J.; and Rabaey, Dirk H. L. C., 4,888,559, Cl. 330-253.000.

Alcon Laboratories, Inc.: *See*—
Edwards, John G., 4,888,327, Cl. 514-41.000.

Alei, Philip E.: *See*—
Flores, David P.; and Alei, Philip E., 4,888,249, Cl. 428-476.100.

Alexander, Carl J., to Pro Power Corporation. Articulated endless-band saw blade and support therefor. 4,887,357, Cl. 30-383.000.

Alexander, Larry G., to Leads Metal Products, Inc. Desoldering apparatus. 4,887,759, Cl. 228-20.000.

Alfa Lancia Industriale S.r.l.: *See*—
Bassi, Aldo, 4,887,862, Cl. 296-204.000.

Alfa Wassermann S.p.A.: *See*—
Rotini, Leone G.; and Marchi, Egidio, 4,888,178, Cl. 424-468.000.

Alfaceu Corporation: *See*—
Szebenyi, Emil; and Kuslima, Shogen, 4,888,172, Cl. 424-105.000.

Alfred Boerner GmbH: *See*—
Pallien, Wilhelm, 4,887,495, Cl. 76-104.00R.

Allen, Ashton D.: *See*—
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Allen-Bradley Company. Inc.: *See*—
Struger, Odo J.; and Sammons, Barry E., 4,888,726, Cl. 364-900.000.

Allen, D. Mason; and Allen, Ashton D. Skateboard. 4,887,825, Cl. 280-87.042.

Allen, Luanne M.; Hagerty, Robert O.; and Mohring, Richard O., to Mobil Oil Corporation. Catalyst composition for polymerizing alpha-olefins. 4,888,318, Cl. 502-105.000.

Allen, Paul M., to Cincinnati Microwave, Inc. Visor clip for mounting radar detector. 4,887,753, Cl. 224-312.000.

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Nguyen, Tuan A., 4,888,014, Cl. 623-6.000.
Ting, Albert C.; Willis, Timothy R.; Christ, F. Richard; Bacich, Steven R.; Pettit, Dean K.; Van Gent, Stanley L.; and Day, Jeffrey C., 4,888,013, Cl. 623-6.000.

Alles, Anthony, to Syntrall Canada Inc. Single use-disposable hypodermic syringe. 4,887,999, Cl. 604-110.000.

Alley, Raymond L., to Mestek, Inc. Modified parallel blade damper for an air handling system. 4,887,641, Cl. 137-601.000.

Allied-Signal Inc.: *See*—
Sundquist, Robert S.; and McBride, Thomas S., 4,888,594, Cl. 342-389.000.
Terpstra, Larry J.; and Babel, William R., 4,888,540, Cl. 318-689.000.

Allison, Robert; and Lefsky, Brian, to Prime Computer, Inc. Memory control system. 4,888,687, Cl. 364-200.000.

Allner, Kurt; Brinkmann, Hans; Kraemer, Bernhard; and Schulte, Herbert, to Dynamit Nobel AG. Process for producing a synthetic resin sheet, especially for a multicolor pattern. 4,888,145, Cl. 264-126.000.

Alpern, Marvin: *See*—
Roshdy, Constance E.; Cerwin, Robert J.; and Alpern, Marvin, 4,887,710, Cl. 206-63.300.

Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, to Siemens Aktiengesellschaft. Device for positioning and fastening a lightwave guide to a base. 4,888,081, Cl. 156-359.000.

Alto Technology: *See*—
Stutz, William A.; Kiss, Laszlo A.; and Rizzi, Joseph D., 4,888,607, Cl. 354-323.000.

Amano, Kenichiro: *See*—
Tsujimoto, Shinichi; Amano, Kenichiro; and Itch, Kenji, 4,888,610, Cl. 354-475.000.

Amano, Toshio: *See*—
Oda, Omasu; and Amano, Toshio, 4,888,819, Cl. 358-192.100.

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Taylor, Michael D.; Maier, Robert M.; Begley, Michael J.; Zmyslowski, Allan J.; Thomas, Jeffrey A.; and Petolino, Joseph A., 4,888,689, Cl. 364-200.000.

AMEPA Angewandte Messtechnik und Prozessautomatisierung GmbH: *See*—
Julius, Edmund, 4,887,798, Cl. 266-99.000.

American Ball Screw: *See*—
Pollo, Joseph L., 4,887,480, Cl. 74-459.000.

American Cyanamid Company: *See*—
Lipp, David W.; and Nagaraj, D. R., 4,888,106, Cl. 209-167.000.
Murdock, Keith C.; and Durr, Frederick E., 4,888,137, Cl. 552-248.000.
Potts, Angela C.; and Gibson, Mark, 4,888,168, Cl. 424-78.000.
Tseng, Shin S.; Dusza, John P.; and Epstein, Joseph W., 4,888,345, Cl. 514-258.000.

American Fence Company: *See*—
Cano, Renne A.; Boness, Don W.; Major, Robert W.; and Valdez, Gabriel A., 4,887,796, Cl. 256-8.000.

American Home Products: *See*—
Keeler, John H., 4,888,744, Cl. 367-90.000.

American Home Products Corporation: *See*—
Leonard, Thomas W.; Mikula, Karol K.; and Schlesinger, Marcia S., 4,888,360, Cl. 514-675.000.
Leonard, Thomas W.; Mikula, Karol K.; and Schlesinger, Marcia S., 4,888,362, Cl. 514-724.000.
Mobilio, Dominick, 4,888,431, Cl. 548-420.000.

American Matrix, Inc.: *See*—
Nixdorf, Richard D.; and Rawlins, Mary H., 4,888,084, Cl. 156-600.000.

American Standard Inc.: *See*—
Scott, Daniel G.; and Hill, Theodore B., 4,887,516, Cl. 92-98.00D.

American Telephone and Telegraph Company: *See*—
Wong, Ching P., 4,888,226, Cl. 428-76.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Johnston, Wilbur D., Jr.; Karlicek, Robert F., Jr.; Long, Judith A.; and Wilt, Daniel P., 4,888,624, Cl. 357-16.000.

Americane, Inc.: *See*—
Archer, Arvo T., 4,887,625, Cl. 135-75.000.

Amerock Corporation: *See*—
Lense, Robert F., 4,887,392, Cl. 49-300.000.

Ametek, Inc.: *See*—
Venthem, John C.; Parnell, James A.; Hill, Mark; and Poole, Dan R., 4,888,710, Cl. 364-520.000.

AMF Bowling, Inc.: *See*—
Chiles III, Robert E.; Neville, Bruce R.; Wattis, Richard D.; and Werthmann, Scott, 4,887,813, Cl. 273-54.00C.

AMF Incorporated: *See*—
Garofalo, Giovanni, 4,887,985, Cl. 441-64.000.

Amici, Francis R.; and Fontaine, Brian, to Coleco Industries, Inc. Vacuum ball holding device. 4,887,820, Cl. 273-323.000.

Amigo Sales, Inc.: *See*—
Shepard, Melvin E.; and Bussinger, Allen L., 4,887,685, Cl. 180-209.000.

Amoco Corporation: *See*—
Thomsen, Leon A., 4,888,743, Cl. 367-75.000.
Topliss, Robert J.; Brockmeier, Norman F.; and Lindahl, Harold A., 4,888,704, Cl. 364-500.000.
Warren, Tommy M.; and Behr, Suzanne M., 4,887,677, Cl. 175-339.000.

AMP Incorporated: *See*—
Bakermans, Johannes C. W., 4,887,452, Cl. 72-420.000.
Bennett, Glenn E.; Daly, John Kevin; Grebe, Robert K.; and Lucius, John E., 4,887,976, Cl. 439-492.000.
Preputnick, George, 4,887,353, Cl. 29-830.000.

Amphenol Corporation: *See*—
Chang, Peter; Bergman, Darrin J.; and Duda, Donald W., 4,887,875, Cl. 350-96.210.

AMSTED Industries Incorporated: *See*—
Klees, David A.; Hoganson, Robert B.; and Data, Harry L., 4,887,422, Cl. 57-220.000.
Wilson, A. Kenneth; and Ballun, John V., 4,887,629, Cl. 137-15.000.

Amtech Technology Corporation: *See*—
Landt, Jeremy A.; Koelle, Alfred R.; and Eckhardt, David A., 4,888,591, Cl. 342-44.000.

Anadrill, Inc.: *See*—
Tannenbaum, Eli; Burgess, Trevor; Kalessidis, Vassilios; Orban, Andre; Williams, John; and Zanker, Klaus, 4,887,464, Cl. 73-153.000.

Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., to Oscar Mayer Foods Corporation. Method for delaying *Clostridium botulinum* growth in fish and poultry. 4,888,191, Cl. 426-281.000.

Andersen, Delmar L.; Keller, David J.; and Streiff, Paul J., to Borden, Inc. Shelf-stable aseptic dairy product. 4,888,194, Cl. 426-570.000.

Andersen, Robert P.; Scott, Paul F.; and Vozenilek, Edward F., to Emhart Industries Inc. Glass container wall thickness inspecting machine. 4,888,824, Cl. 324-61.00R.

Anderson, David S.; and Geddis, Michael E., to General Mills, Inc. Carton end closure. 4,887,718, Cl. 206-611.000.

Anderson, David W., Jr. Refrigeration cleaning and flushing system. 4,887,435, Cl. 62-85.000.

Anderson, Frank E.; Gay, Christopher J.; Hightower, Scott A.; and Luton, Karen G., to International Business Machine Corp. Keyboard

arrangement with ghost key condition detection. 4,888,600, Cl. 341-24.000.

Anderson, Karen L.: *See*—
Mitchell, Joan L.; Anderson, Karen L.; and Geortzel, Gerald, 4,888,645, Cl. 358-261.100.

Anderson Strathclyde PLC: *See*—
Porteous, Alexander; and McIntosh, Angus J., 4,887,867, Cl. 299-42.000.

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Ando, Hiroyuki: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,887,769, Cl. 239-493.000.

Ando, Hisashige; Katsuyama, Makoto; and Sakuraba, Takahiro, to Fujitsu Limited. Vector pattern processing circuit for bit map display system. 4,888,584, Cl. 340-747.000.

Andoh, Yukio: *See*—
Ishiwaka, Takumi; Andoh, Yukio; Yamaguchi, Michiyuki; Suzuki, Shosuke; Egashira, Yoshinori; Yokobori, Takeo; and Ohashi, Takashi, 4,887,923, Cl. 400-659.000.

Andrews, Claude R.: *See*—
Kosin, John A.; and Andrews, Claude R., 4,888,160, Cl. 423-430.000.

Andrews, Del. Bait tank. 4,887,380, Cl. 43-56.000.

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Lagasse, Lyle E.; and Andrews, Dennis D., 4,888,748, Cl. 368-107.000.

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Bowman, James A.; and Andrews, Ronald W., 4,888,315, Cl. 501-144.000.

Angelsen, Bjorn A. J.; and Linker, David. Laser catheter delivery system for controlled atheroma ablation combining laser angioplasty and intra-arterial ultrasonic imagining. 4,887,605, Cl. 128-660.030.

Angio-Medical Corporation: *See*—
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,888,324, Cl. 514-25.000.

Angstadt, John J., to Procter & Gamble Company, The. Absorbent core having a dusting layer. 4,888,231, Cl. 428-213.000.

Anilionis, Algis: *See*—
Palmer, John L.; and Anilionis, Algis, 4,888,280, Cl. 435-69.700.

Animated Voice Corporation: *See*—
Jenkin, Keith R.; and Chan, Shufan, 4,888,806, Cl. 381-35.000.

Anstee, L. Lavern: *See*—
Crane, Jack W.; Anstee, L. Lavern; VanGinhoven, Robert M.; and Jennings, Richard E., 4,887,416, Cl. 56-13.600.

Answer Products, Inc.: *See*—
Boyer, Scott M.; Cole, Steven J.; Gauvin, Roger A.; and Mitchell, Joe C., 4,887,754, Cl. 224-319.000.

Aoki, Akio: *See*—
Enari, Masahiko; Aoki, Akio; Matsushita, Machiko; Matsuoka, Hiroshi; and Minoura, Kazuo, 4,888,753, Cl. 369-44.000.

Aoki, Kanemasa, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha. Motor. 4,888,511, Cl. 310-237.000.

Aoyama Gankyo Kabushiki Kaisha: *See*—
Akagi, Terumi, 4,887,896, Cl. 351-63.000.

Aper, Ludwig. Motor vehicle having a central extension section. 4,887,859, Cl. 296-26.000.

Appel, Hans-Gunter; Ohm, Heinz-Friedrich; Bluhm, Klaus; and Probst, Kurt, to VDO Adolf Schindling AG. Method of monitoring the end position of a controlling element and circuit arrangement for the carrying out of the method. 4,888,537, Cl. 318-626.000.

Appelgren, Curt H.; and Eskilsson, Eva C., to Lejus Medical Aktiebolag. Diuretic composition. 4,888,179, Cl. 424-480.000.

Appleton Mills: *See*—
Gulya, Thomas G.; Schultz, Gary V.; and Arnold, Ronald A., 4,888,095, Cl. 162-202.000.

Aquacorp Limited: *See*—
Hancock, Arnold H., 4,887,852, Cl. 285-175.000.

Aquasafe, Inc.: *See*—
Kato, Csaba, 4,887,987, Cl. 441-96.000.

Arai, Kenji; Morita, Kouichi; Mito, Nobuaki; and Hirata, Naonori, to Sumitomo Chemical Company, Limited. Cyclohexenone derivative, process for producing the same and herbicides comprising the same as active ingredient. 4,888,042, Cl. 71-88.000.

Arai, Masanobu, to NEC Corporation. Echo canceller for bidirectional transmission on two-wire subscriber lines. 4,888,762, Cl. 370-32.100.

Arai, Nobukatsu; Sekine, Yoshihito; Osawa, Tadao; Tokuda, Hiroatsu; Usui, Toshifumi; and Tsutsui, Mitsukuni, to Hitachi, Ltd. Hot-wire type air flow meter and an internal combustion engine with the same. 4,887,577, Cl. 123-494.000.

Arai, Shigeru, to Fujitsu Limited. Focusing and tracking servo system for controlling the projection of an optical beam on an optical disk. 4,888,752, Cl. 369-44.000.

Arai, Tetsuji: *See*—
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, 4,888,271, Cl. 430-328.000.

Arai, Yoshinobu: *See*—
Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, 4,888,351, Cl. 514-397.000.

Arakawa, Yoshiaki: *See*—
Naitoh, Kazumi; and Arakawa, Yoshiaki, 4,888,666, Cl. 361-512.000.

Araki, Kazuhiro; and Mishima, Nobuhiro, to Minolta Camera Kabushiki Kaisha. Image forming apparatus for selective copying of segmented areas of an image. 4,888,615, Cl. 355-200.000.

Arao, Kozo: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,888,062, Cl. 136-258.000.

Arata, Ryozo: *See*—
Tajima, Kenji; Tsuboi, Tetsuo; and Arata, Ryozo, 4,888,371, Cl. 524-120.000.

Araya, Aoraham, to Unilever Patent Holdings BV. Hydrophobic, highly porous, three-dimensional inorganic structures. 4,888,309, Cl. 501-80.000.

Archer, Arvo T., to Americane, Inc. Collapsible cane. 4,887,625, Cl. 135-75.000.

Arciszewski, Henry: *See*—
Given, Peter S., Jr.; and Arciszewski, Henry, 4,888,187, Cl. 426-102.000.

Arena, John P., to Manville Corporation. Article separating and loading apparatus. 4,887,414, Cl. 53-543.000.

Argosy Electronics: *See*—
Preves, David A., 4,888,810, Cl. 381-109.000.

Ariel Vineyards, Inc.: *See*—
Gnekow, Barry R., 4,888,189, Cl. 426-231.000.

Arimoto, Shinobu, to Canon Kabushiki Kaisha. Image reading apparatus. 4,888,492, Cl. 250-578.000.

Aritech Corporation: *See*—
Guscott, John K., 4,888,581, Cl. 340-666.000.

Arlington, David L.; Cole, Jacqueline M.; Hazelzet, Bruce G.; Krolak, David J.; Li, Hehching H.; Oza, Bharat J.; and Weaver, A. Frank, to International Business Machines Corporation. Smart memory card architecture and interface. 4,888,773, Cl. 371-40.200.

Armstrong, Jean: *See*—
Siebert, Gary R.; and Armstrong, Jean, 4,888,296, Cl. 436-500.000.

Arnold, Ronald A.: *See*—
Gulya, Thomas G.; Schultz, Gary V.; and Arnold, Ronald A., 4,888,095, Cl. 162-202.000.

Arnold, William D., to Lee-Rowan Company. Modular office furniture system. 4,887,538, Cl. 108-111.000.

Asahi Chemical Research Laboratory, Ltd.: *See*—
Sato, Yoneji; Hoshino, Masato; Kitazawa, Seiichi; and Yasuda, Tadashi, 4,888,269, Cl. 430-280.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Wada, Akihiro; Kakuta, Rin-ichi; Ohuchi, Kenji; Sugiyama, Jun; and Hasegawa, Shinji, 4,888,387, Cl. 525-66.000.

Asai, Junichi: *See*—
Kobayashi, Takeshi; and Asai, Junichi, 4,887,943, Cl. 417-295.000.

Asai, Susumu; Sugimoto, Haruhide; Fujisaki, Masaru; Shigetomi, Tadatoshi; and Kobayashi, Hisatoshi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle frame. 4,887,687, Cl. 180-219.000.

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Kondoh, Eiki; Morinaga, Shigeki; Yaginuma, Takao; and Asai, Takeshi, 4,888,721, Cl. 364-736.000.

ASEA Aktiebolag: *See*—
Brantmark, Håkan; Lindqvist, åke; and Norefors, Ulf-Goran, 4,888,708, Cl. 364-513.000.

Asea Brown Boveri AB: *See*—
Kolavcic, Pavel; Sobel, Jarl; and Ornholmer, Lars, 4,887,471, Cl. 73-862.690.

Asher, Marc A.: *See*—
Heinig, Charles F.; Asher, Marc A.; and Strippgen, Walter E., 4,887,595, Cl. 606-61.000.

Ashton, Thomas. Modular automotive seat frame. 4,887,864, Cl. 297-375.000.

Aspen Industries, Inc.: *See*—
Rojc, Karl J., 4,888,664, Cl. 361-383.000.

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Cunnane, Francis J., 4,887,648, Cl. 139-383.00H.

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Lando, David J.; and Wight, Frederick R., Jr., 4,888,450, Cl. 174-68.500.

Atago, Takeshi: *See*—
Fujiwara, Yasuhiko; Abe, Toshiro; Hashimoto, Atsunori; Nakazawa, Shinsuke; Nagano, Masami; and Atago, Takeshi, 4,887,573, Cl. 123-422.000.

Atkinson, Donald M.: *See*—
Schlameus, Herman W.; Lew, Chel W.; and Atkinson, Donald M., 4,888,140, Cl. 264-4.300.

Atwell, William H.; Burns, Gary T.; and Saha, Chandan K., to Dow Corning Corporation. Curable organopolysiloxanes filled with silicon carbide powders and highly densified sintered bodies therefrom. 4,888,376, Cl. 524-401.000.

Audet, Carol, to Les Piscines Et Abris Tempo, Inc. Shelter with releasable ballast members. 4,887,627, Cl. 135-120.000.

Audio-Technica U.S., Inc.: *See*—
Reichel, Kenneth R., 4,888,807, Cl. 381-92.000.

Augat Inc.: *See*—
Damon, Neil F.; and Senor, Ronald E., 4,887,981, Cl. 439-885.000.

Austin, Thomas F.; Donadio, Frank L., Jr.; Rudolph, David F.; and Shaw, Robert W., Jr., to Gill & Duffus Products, Inc. Apparatus and method for marking bulk loaded containers to indicate the presence of metallic contaminants. 4,887,475, Cl. 73-866.000.

Automatik Machinery Corporation: *See*—
Harvey, Robert J., 4,888,484, Cl. 250-343.000.

Automobiles Citroen: *See*—
De Vaulx, Louis, 4,888,575, Cl. 340-426.000.

Automobiles Peugeot: *See*—
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Avery, Gil. Wet bulb sensor system. 4,887,466, Cl. 73-338.000.
Avery International Corporation: *See*—
Freedman, Melvin S., 4,888,075, Cl. 156-243.000.
Avon Products, Inc.: *See*—
Dulak, Michael P.; and Zecchino, Julius R., 4,888,363, Cl. 514-725.000.
Israel, Gary; Nadzan III, Andrew; and Deierlein, William, 4,887,409, Cl. 53-436.000.
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B. F. Goodrich Company, The: *See*—
Hartitz, J. Ernst, 4,888,148, Cl. 264-209.500.
Kramer, James H., 4,887,934, Cl. 405-213.000.
Redenbarger, Philip D.; and Megginson, George W., 4,887,696, Cl. 188-73.450.
Sidles, James, 4,888,228, Cl. 428-86.000.
Baasner, Bernd; Klausener, Alexander; and Ooms, Pieter, to Bayer Aktiengesellschaft. Flourine-containing 5-trihalogenomethyl-isoxazoles and a process for their preparation. 4,888,430, Cl. 548-247.000.
Baba, Kenji; Yahagi, Hayao; Watanabe, Shoji; Hara, Naoki; Yoda, Mikio; Mori, Shunji; Iida, Takashi; Katori, Takashi; and Ishida, Masahiko, to Hitachi Engineering Co., Ltd.; and Hitachi, Ltd. Apparatus for monitoring the toxicant contamination of water by using aquatic animals. 4,888,703, Cl. 364-496.000.
Babcock Industries Inc.: *See*—
Chaczyk, Adam W.; and Brown, Kelvin T., 4,887,930, Cl. 403-379.000.
Babcock & Wilcox Company, The: *See*—
Carter, Hudson R.; and Upperman, Eugene T., 4,887,453, Cl. 73-1.00R.
Downs, William, 4,888,158, Cl. 423-242.000.
Peet, William J., 4,887,431, Cl. 60-667.000.
Babel, William R.: *See*—
Terpstra, Larry J.; and Babel, William R., 4,888,540, Cl. 318-689.000.
Bacich, Steven R.: *See*—
Ting, Albert C.; Willis, Timothy R.; Christ, F. Richard; Bacich, Steven R.; Pettit, Dean K.; Van Gent, Stanley L.; and Day, Jeffrey C., 4,888,013, Cl. 623-6.000.
Bacon, Forrest C.; and Pribbernow, Dale E., to Kliklok Corporation. Self-cleaning weighing hopper and drive mechanism. 4,887,679, Cl. 177-245.000.
Bacus, James W., to Cell Analysis Systems, Inc. Method and method and apparatus for control of light intensity for image analysis. 4,887,892, Cl. 350-523.000.
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Baijnath, Etienette. Restraint mitt for restraining a wearer's hand and arm. 4,887,616, Cl. 128-879.000.
Bailey, Angileen; and Spector, George. Changeable shoe tops/heels. 4,887,369, Cl. 36-101.000.
Bailey, Denis M.; and Kumar, Virendra, to Sterling Drug Inc. 3,4, or 5-aryl-1H-pyrazole-1-alkanamides as antiarrhythmic agents, compositions and use. 4,888,352, Cl. 514-406.000.
Bailey, Mark R. Touring ski binding. 4,887,833, Cl. 280-615.000.
Bains, Kuldip S., to General DataComm, Inc. Algorithm for selecting channels for multiplexer frame. 4,888,770, Cl. 370-110.100.
Baker, Charles D.; Brimhall, Owen D.; and Messinger, James E., to Separation Techology, Inc. Hematocrit reader apparatus and method. 4,887,458, Cl. 73-61.10R.
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Maendel, Benjamin, 4,888,468, Cl. 219-347.000.
Baker Hughes Incorporated: *See*—
Frisby, Raymond A.; and Conover, George E., 4,887,931, Cl. 405-171.000.
Baker, William H., to British Aerospace Public Limted Company. Solder coating processes. 4,887,762, Cl. 228-260.000.
Bakermans, Johannes C. W., to AMP Incorporated. Sprocket-type strip feed. 4,887,452, Cl. 72-420.000.
Baliga, Bantval J.: *See*—
Pattanayak, Deva N.; and Baliga, Bantval J., 4,888,627, Cl. 357-23.400.
Ballard, Gary W.: *See*—
Thompson, Kevin D.; and Ballard, Gary W., 4,887,767, Cl. 236-1.0EB.
Balloni, Ricardo; Keung, Jay K.; and Mount, Eldridge M., III, to Mobil Oil Corporation. Process for manufacturing a metallized polyolefin film and resulting film. 4,888,237, Cl. 428-347.000.
Ballun, John V.: *See*—
Wilson, A. Kenneth; and Ballun, John V., 4,887,629, Cl. 137-15.000.
Bambeck, Gregory S.: *See*—
Sibley, Kenneth R.; and Bambeck, Gregory S., 4,887,376, Cl. 43-42.060.
Band-It-Idex, Inc.: *See*—
Jansen, George A.; and Hinnen, Hans R., 4,887,334, Cl. 24-23.00R.
Bando, Akio: *See*—
Suzuki, Yasunobu; Kato, Motohiko; Bando, Akio; Ishida, Hisao; and Nishimura, Akihiro, 4,887,758, Cl. 228-5.100.
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Madsen, Knud E.; and Nielsen, Runo R., 4,888,529, Cl. 315-370.000.
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Newman, Neil A.; and Bankstahl, Herbert A., 4,887,982, Cl. 440-81.000.
Banquy, David L., to Foster Wheeler USA Corporation. Process for the production of synthesis gas. 4,888,130, Cl. 252-373.000.
Bar-Master International: *See*—
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Kroll, John W.; Baran, Michael S.; and Mading, James E., 4,887,430, Cl. 60-527.000.
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Barndt, Robert A., Sr. Clock decoder and data bit transition detector for fiber optic work station. 4,888,791, Cl. 375-23.000.
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Barnoach, Itzhak, to Kitechnology B.V. Tube Connector. 4,887,847, Cl. 285-52.000.
Barrandon, Yann; and Green, Howard, to President and Fellows of Harvard College. Human epithelium originating from cell cultures. 4,888,291, Cl. 435-240.241.
Bartelink, E. H. B., to Academy of Applied Science. Shock-proof mains voltage supply outlet and method. 4,888,660, Cl. 361-49.000.
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Sandvig, Timothy C.; Bartizal, Dennis C.; Scholz, Matthew T.; Campagna, Anthony J.; and Libbey, Chris J., 4,888,225, Cl. 428-71.000.
Bartlett, Jon G.: *See*—
Payne, Peter A.; Bartlett, Jon G.; and Harris, Natalie K., 4,887,455, Cl. 73-27.00R.
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Blum, Rainer; Belde, Horst; Osterloh, Rolf; and Uhl, Guenter, 4,888,124, Cl. 252-182.200.
Ebel, Klaus; Reuther, Wolfgang; Fikentscher, Rolf; Lach, Dietrich; Streicher, Rolf; and Schaffer, Ortwin, 4,888,412, Cl. 528-230.000.
Kleitz, Jean-Pierre; and Mertzeisen, Piere H. A., 4,888,134, Cl. 252-511.000.
Rueb, Lothar; Eicken, Karl; Zeeh, Bernd; Meyer, Norbert; and Wuerzer, Bruno, 4,888,046, Cl. 71-90.000.
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Riley, Robert E.; and Naravan, Thirumurti, 4,888,365, Cl. 521-157.000.
Bass, Michael; and Copley, Stephen M., to University of Southern California. Optical proximity apparatus and method using light sources being modulated at different frequencies. 4,888,490, Cl. 250-561.000.
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Morris, John L., 4,887,377, Cl. 43-42.240.
Bassi, Aldo, to Alfa Lancia Industriale S.r.l. Bodywork for a vehicle, in particular for an automobile, and process for manufacturing it. 4,887,862, Cl. 296-204.000.
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Bateman, Brian, to Polytech Netting Industries. Cord cinching device. 4,887,337, Cl. 24-136.00R.
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Bichon, Daniel; and Lamy, Bernard, 4,888,398, Cl. 525-420.000.
Richon, Dominique; De Pous, Olivier; and Fontaine, Pierre, 4,888,310, Cl. 501-92.000.
Bauer, Heinz, to Linde Akteingesellschaft. Process and apparatus for separation of a gaseous mixture. 4,888,035, Cl. 62-20.000.
Bauer, Karl-Heinz, to Preh, Elektrofeinmechanische Werke Jacob Preh, Nachf. GmbH & Co. Air outlet device. 4,887,520, Cl. 98-2.000.
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Spohr, Horst, 4,887,657, Cl. 160-178.100.
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O'Brien, Michael; Leishman, Lorie; and O'Brien, Christine A., 4,887,326, Cl. 5-421.000.
Baxter International Inc.: *See*—
Posey, John L.; and Swank, Ronald W., 4,888,155, Cl. 422-49.000.
Rondeau, George; and Soubrier, Pierre, 4,887,411, Cl. 53-493.000.
Susini, Etienne; and Soubrier, Pierre, 4,887,973, Cl. 493-213.000.

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Baasner, Bernd; Klausener, Alexander; and Ooms, Pieter, 4,888,430, Cl. 548-247.000.
Brandes, Wilhelm; Kaspers, Helmut; Reinecke, Paul; Scheinpflug, Hans; and Kramer, Wolfgang, 4,888,349, Cl. 514-383.000.
Freitag, Dieter; Joswig, Thomas; Idel, Karsten; Fullmann, Heinz-Josef; and Muller, Friedemann, 4,888,370, Cl. 524-100.000.
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Henning, Wolfgang; Langenthal, Wolfram V.; Perrey, Hermann; and Striegler, Hellmut, 4,888,379, Cl. 524-500.000.
Jonas, Friedrich; and Waldenrath, Werner, 4,888,243, Cl. 428-411.100.
Koll, Jochen; Muller, Friedhelm; Bieber, We.ner; Konig, Joachim; Eckstein, Udo; and Theidel, Hans, 4,888,128, Cl. 252-301.230.
Konig, Klaus; and Heitkamper, Peter, 4,888,125, Cl. 252-182.210.
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Keeffe, William M.; Karlotski, Robert J.; Kulik, Joseph S.; and Bazin, Simone P., 4,888,517, Cl. 313-25.000.

BBC Brown Boveri AG: *See—*
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DiVito, Fred; and Beal, Christopher I., 4,887,323, Cl. 4-577.000.

Bean, W. Ralph: *See—*
Rudd, M. David, Sr., 4,887,356, Cl. 30-30.000.

Beasley, Craig J., to Western Atlas International, Inc. Method of migrating seismic data. 4,888.742, Cl. 367-53.000.

Beatty, Robert F. Apparatus for and method of spectral analysis enhancement of polygraph examinations. 4,887,607, Cl. 128-670.000.

Beatty, Scott M., to Sargent & Greenleaf, Inc. Electronic lock for hotel room safes and the like. 4,887,445, Cl. 70-278.000.

Beaupied, Dolores Y. Garment to hold a ostomy appliance. 4,888,006, Cl. 604-345.000.

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Gregerson, Glen M.; Lunenschloss, John T.; Ebbott, Henry M.; and Beckeman, Raymond A., 4,887,954, Cl. 414-401.000.

Becker, Bruce H.: *See—*
Goodrich, Winston D.; Wesselski, Clarence J.; Pelischek, Timothy E.; Becker, Bruce H.; Kahn, Jon B.; Grimaldi, Margaret E.; McManamen, John P.; and Castro, Edgar O., 4,887,780, Cl. 244-137.200.

Becker, Gregory K.; and Martz, Dowell E., to United States of America, Energy. Beta/alpha continuous air monitor. 4,888,485, Cl. 250-370.060.

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Zackrisson, Barry L.; and Beckman, John A., 4,888,224, Cl. 428-35.900.

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Siebert, Gary R.; and Armstrong, Jean, 4,888,296, Cl. 436-500.000.
Wagner, Daniel B., 4,888,288, Cl. 435-21.000.

Bedford, Peter H. Applicator swabs and method of making same. 4,887,994, Cl. 604-1.000.

Beery, Kenneth E.; and Konwinski, Arthur H., to Central Soya Company. Compressed texturized soy protein product and process for making same. 4,888,198, Cl. 426-656.000.

Beever, William H.: *See—*
Liang, Yeon F.; and Beever, William H., 4,888,390, Cl. 525-189.000.

Bege, Dietmar: *See—*
Schmitt, Wolfgang; and Bege, Dietmar, 4,888,818, Cl. 324-439.000.

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Elger, Walter; Beier, Sybille; Fahnrich, Marianne; Kosub, Beate; Chwalisz, Krzysztof; and Hasan, Syed H., 4,888,331, Cl. 514-170.000.

Belbel, Elie; Boucheron, Thierry; Lauraire, Michel; and Riotte, Jean-Paul, to La Telemecanique Electrique. Circuit and apparatus for the protected supply of a load by means of static and electromechanical switches. 4,888,661, Cl. 361-102.000.

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Belka, Anthony M.: *See—*
ReMine, Walter J.; and Belka, Anthony M., 4,888,579, Cl. 340-572.000.

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Lee, Tien-Pei, 4,888,785, Cl. 372-50.000.

Bellanger, Michael P., to Minnesota Mining and Manufacturing Company. Strip material with tab-like parts for forming fasteners. 4,887,339, Cl. 24-575.000.

Belly, Robert T.: *See—*
Cichanowicz, Peggy W.; and Belly, Robert T., 4,888,287, Cl. 435-34.000.

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Dimitrov, Dimith T.; Matjukhina, Ljudimila I.; Mikhalev, Alexandr S.; and Chushenkov, Igor M., 4,888,538, Cl. 318-675.000.

Bengmark, Stig. Method and tube equipment for supplying fluid to a space and draining said space. 4,887,996, Cl. 604-54.000.

Benignus, Douglas M.; and Browning, Luke M., to International Business Machines Corporation. Diagnostic configuration management for a data processing system. 4,888,771, Cl. 371-16.100.

Bennett, Glenn E.; Daly, John Kevin; Grebe, Robert K.; and Lucius, John E., to AMP Incorporated. Electrical terminals for flat power cable. 4,887,976, Cl. 439-492.000.

Bennett, James R., to Thermo Blender Inc. Blender with thermally insulated container. 4,887,909, Cl. 366-199.000.

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Beremand, Phillips D.; Ohlrogge, John B.; and Kuhn, David N., to United States of America, Agriculture; and Purdue University. Synthetic gene for acyl carrier protein. 4,888,282, Cl. 435-193.000.

Berendse, Cornelis Maria: *See—*
Van Wezel, Antonius L., deceased; De Haan, Hans H.; and Vermeij, Stephan, 4,888,294, Cl. 435-316.000.

Bergemont, Albert, to Eurotechnique. Dynamic memory in integrated circuit form. 4,888,628, Cl. 357-23.600.

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Berger, Richard C.; and Berger, Paul L., 4,887,399, Cl. 52-27.000.

Berger, Philippe; Berland, Pierre A.; and Douziech, Patrick, to Deutsche Thomson-Brandt GmbH. Voltage-controlled crystal oscillator with variable phase feedback. 4,888,567, Cl. 331-116.00R.

Berger, Richard C.; and Berger, Paul L. Soundproof roof curb. 4,887,399, Cl. 52-27.000.

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Chang, Peter; Bergman, Darrin J.; and Duda, Donald W., 4,887,875, Cl. 350-96.210.

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Bernard, Esparbes, to Aerospatiale Societe Nationale Industrielle, Societe Anonyme. Internal-combustion engine having opposed integral annular pistons and a central shaft. 4,887,558, Cl. 123-58.00C.

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Letovsky, Howard; and Fried, Bernard, 4,887,967, Cl. 434-61.000.

Bernasek, Edward; Bridle, Kenneth A.; Clapp, William L.; and Fagg, Barry S., to R. J. Reynolds Tobacco Company. Tobacco processing. 4,887,618, Cl. 131-297.000.

Bernat, Georg J., to Dorf Industries Pty. Ltd. Single handle mixing tap or valve. 4,887,642, Cl. 137-625.410.

Bernier, Jean-Claude; Poix, Paul J. L.; Rehspringer, Jean-Luc; Vilmin, Gabriel G. J.; and Vilminot, Serge, to Center National De La Recherche Scientifique (C.N.R.S.). Low-temperature sinterable cordierite type ceramic powder, preparation process and ceramic composition produced by sintering this powder. 4,888,314, Cl. 501-119.000.

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Mathiesen, Mait M.; Gillberg, Lars I.; Hellsten, Karl M. E.; and Karlsson, Gunvor B. T., 4,887,383, Cl. 44-51.000.

Berry, Mark D.; Brisker, Henry C.; and Cuneo, Andrew A., Jr., to United States of America, Army. Device for measuring seam resistance. 4,888,546, Cl. 324-64.000.

Bertalan, Philippe, to Thomson-CSF. Method for making an ultra-high frequency transition between two orthogal guided structures and ultra-high frequency device with a transition of this type. 4,887,346, Cl. 29-600.000.

Bertini, Vincenzo; De Munno, Angela; Lucchesini, Francesco; Buffoni, Franca; and Bertocci, Barbara, to Consiglio Nazionale Delle Ricerche. Selective inhibitors of benzylaminoxidases with respect to other aminoxidases. 4,888,283, Cl. 435-184.000.

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Better Life International, Inc.: *See—*
Summers, John K., 4,887,620, Cl. 131-352.000.

Bezdek, William J. Food spill catching and serving device. 4,887,315, Cl. 2-49.00A.

Bianco, Rodolfo. Cleaning and polishing tool. 4,887,508, Cl. 86-23.000.

Bichon, Daniel; and Lamy, Bernard, to Battelle Memorial Institute. Biodegradable polypeptide and the use thereof for the gradual release of drugs. 4,888,398, Cl. 525-420.000.

Bieber, Werner: *See—*
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Bierdeman, Donald H.: *See—*
Hallett, Thomas D.; and Bierdeman, Donald H., 4,887,823, Cl. 280-19.000.

Biermann, Manfred: *See—*
Schroeder, Peter; Bouten, Hans; and Biermann, Manfred, 4,888,325, Cl. 514-25.000.

Biesecker, Douglas A.: *See—*
Porterfield, Richard F.; and Biesecker, Douglas A., 4,887,351, Cl. 29-740.000.

Bihari, Bernard; and Drury, Finvola. Method for the treatment of persons infected with HTLV-III (AIDS) virus. 4,888,346, Cl. 514-282.000.
Billings, John K.: *See—*
Hossack, James M.; Powers, Jeffrey E.; and Billings, John K., 4,888,086, Cl. 156-639.000.
Birli, Joseph A., Jr.: *See—*
Birli, Joseph A., Sr.; and Birli, Joseph A., Jr., 4,887,429, Cl. 60-527.000.
Birli, Joseph A., Sr.; and Birli, Joseph A., Jr., to Design & Manufacturing Corporation. Electro-thermal actuator. 4,887,429, Cl. 60-527.000.
Bishop, Robert P., to Texas Instruments Incorporated. High pressure package for pressure transducers. 4,888,662, Cl. 361-283.000.
Black, Jerry G.: *See—*
Rothschild, Mordechai; Black, Jerry G.; and Ehrlich, Daniel J., 4,888,203, Cl. 427-53.400.
Bladt, Detlev V. Cigarette and matches container. 4,887,711, Cl. 206-92.000.
Blaich, Ilga E. Hanger hook. 4,887,785, Cl. 248-339.000.
Blair, Richard C.: *See—*
Gladish, Herbert E.; Hallett, Ronald C.; and Blair, Richard C., 4,887,706, Cl. 198-774.000.
Blake, William S. Aerosol valve. 4,887,743, Cl. 222-402.100.
Blaser, Theodor: *See—*
Grutzmacher, Bertold; and Blaser, Theodor, 4,887,810, Cl. 271-225.000.
Blasko, Raymond J., to General Motors Corporation. Panel mounted breakout fitting. 4,888,453, Cl. 174-135.000.
Blatt, Brian L. Automobile trunk table. 4,887,526, Cl. 108-44.000.
Blattler, Walter A.: *See—*
Lambert, John M.; Blattler, Walter A.; and Senter, Peter D., 4,888,415, Cl. 530-390.000.
Bleijenberg, Robert, to U.S. Philips Corporation. Drive arrangement, and motor-energizing system for use in the arrangement. 4,888,543, Cl. 318-721.000.
Block, Donald P., to Orange Service Company, Inc. Shallow angle furrow refurbishing method and apparatus. 4,887,372, Cl. 37-91.000.
Bluhm, Klaus: *See—*
Appel, Hans-Gunter; Ohm, Heinz-Friedrich; Bluhm, Klaus; and Probst, Kurt, 4,888,537, Cl. 318-626.000.
Blum, Rainer; Belde, Horst; Osterloh, Rolf; and Uhl, Guenter, to BASF Aktiengesellschaft. Preparation of stable dispersions of finely divided polyisocyanates and preparation of heat-crosslinkable isocyanate systems. 4,888,124, Cl. 252-182.200.
Blum, Victor, to Odetics, Inc. Method of writing and reading digital data interspersed with analog audio frequency data on magnetic recording tape. 4,888,654, Cl. 360-74.100.
Bo-James Co., Inc.: *See—*
Sheehan, Larry A.; and James, John R., 4,887,378, Cl. 43-42.250.
Board of Regents, The University of Texas, The: *See—*
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BOC Group, Inc., The: *See—*
Bandyopadhyay, Nikhiles; Tamhankar, Satish S.; and Kirschner, Mark J., 4,888,037, Cl. 65-32.200.
Felts, John T.; and Lopata, Eugene S., 4,888,199, Cl. 427-10.000.
BOC, Inc.: *See—*
Halpern, Donald F.; and Robin, Mark L., 4,888,139, Cl. 562-840.000.
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Bockmann, Klaus: *See—*
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Boden, Eugene P.; and Krabbenhoft, Herman O., to General Electric Company. Preparation of branched thermoplastic polycarbonate from polycarbonate and polyhydric phenol. 4,888,400, Cl. 525-462.000.
Bodensiek, Paul H.: *See—*
Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G., 4,888,089, Cl. 156-644.000.
Bodor, Nicholas S., to University of Florida. Amino acids containing dihydropyridine ring systems for site-specific delivery of peptides to the brain. 4,888,427, Cl. 546-316.000.
Boeing Company, The: *See—*
Groves, Oliver J., 4,887,646, Cl. 138-90.000.
Large, David T., 4,887,779, Cl. 244-1.00R.
Boger, Manfred: *See—*
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Bohlman, James G.: *See—*
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Bohn, Helmut; Just, Melitta; and Nitz, Rolf-Eberhard, to Cassella Aktiengesellschaft. Allymercaptoacetylsydnonimines, processes for their preparation, and their use. 4,888,333, Cl. 514-212.000.
Bohn, Jerry W., to A. C. Nielsen Company. System for substituting television programs transmitted via telephone lines. 4,888,638, Cl. 358-84.000.
Boissonnet, Michel: *See—*
Issard, Gerard; and Boissonnet, Michel, 4,887,928, Cl. 403-287.000.
Bokros, Jack C., to Carbomedics, Inc. Heart valve prosthesis with improved recess design. 4,888,010, Cl. 623-2.000.
Bollong, Alan B. I.; Bult, Roelof P.; and Proux, Gary T., to Cominco Ltd. Method for the zone refining of gallium. 4,888,051, Cl. 75-10.110.
Bonar Plastics Ltd.: *See—*
Pett, Bruce; and Wain, David, 4,887,731, Cl. 220-1.500.
Bond, Irvin D. Quick disconnect apparatus for a loader boom. 4,887,927, Cl. 403-68.000.
Boness, Don W.: *See—*
Cano, Renne A.; Boness, Don W.; Major, Robert W.; and Valdez, Gabriel A., 4,887,796, Cl. 256-8.000.
Bonewicz, Theodore J., Jr.; and Leichter, Henry S., to Al-Mar Precision Co. Carrier for use on beaches, etc. 4,887,837, Cl. 280-654.000.
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Bong, Ban S.; Yu, Francis T.; and Bremer, Robert, to United States of America, Air Force. Temperature compensated stable duty cycle crystal oscillator apparatus. 4,888,566, Cl. 331-116.00R.
Bonn, Brian T., to Seagate Technology, Inc. Air filtration system for disc drives. 4,888,655, Cl. 360-97.030.
Bonnard, Pierre: *See—*
Bonnard, Rene; Bonnard, Pierre; and Desclozeaux, Christopher, 4,887,990, Cl. 474-78.000.
Bonnard, Rene; Bonnard, Pierre; and Desclozeaux, Christopher, to R. Bonnard, P. Bonnard, C. Desclozeaux, and BG Innovations (SARL). Gear-shift control bicycles and similar vehicles. 4,887,990, Cl. 474-78.000.
Bonner, David W. Internally indexed building block and method of construction. 4,887,403, Cl. 52-286.000.
Borden, Inc.: *See—*
Andersen, Delmar L.; Keller, David J.; and Streiff, Paul J., 4,888,194, Cl. 426-570.000.
Gallant, William E., 4,887,333, Cl. 17-74.000.
Boreland, Charles P., to General DataComm, Inc. Parallel arithmetic-logic unit for as an element of digital signal processor. 4,888,722, Cl. 364-736.500.
Borer, John W.: *See—*
Herrington, Richard A.; Flaugher, Jeffrey R.; Borer, John W.; Woodward, Alan C.; and Greenhalgh, Geoffrey, 4,888,038, Cl. 65-114.000.
Borgis, Livio, to U.S. Philips Corporation. Electric lamp and method of manufacturing same. 4,888,519, Cl. 313-318.000.
Borgwardt, Peter A.: *See—*
Ligocki, Terry J.; and Borgwardt, Peter A., 4,888,583, Cl. 340-729.000.
Borza, John S.: *See—*
Drutchas, Gilbert H., deceased; and Borza, John S., 4,887,682, Cl. 180-79.100.
Bost, John R. Anti-friction sorting roll and stabilizer. 4,887,723, Cl. 209-670.000.
Boston Scientific Corporation: *See—*
Mohl, Werner; and Tolkoff, Marc J., 4,887,608, Cl. 128-673.000.
Boston University, Trustees of: *See—*
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,888,324, Cl. 514-25.000.
Bothwell, Peter W. Internal combustion engine. 4,887,565, Cl. 123-90.260.
Bott, John A. Cargo restraint system for pick-up truck bedliners. 4,887,947, Cl. 410-144.000.
Bottomley, Robin C.; Colvin, Robert D.; and Van Blanton, Madison, to Express Foods Group Limited. Decolorising of whey and products derived from whey. 4,888,184, Cl. 426-41.000.
Boucheron, Thierry: *See—*
Belbel, Elie; Boucheron, Thierry; Lauraire, Michel; and Riotte, Jean-Paul, 4,888,661, Cl. 361-102.000.
Boudreaux, Edwin, Jr., to Phillips Petroleum Company. Process to graft stereoregular polymers of branched, higher alpha-olefins and compositions thereof. 4,888,394, Cl. 525-285.000.
Bouin, Gerard. Lifter apparatus of variable geometry for crops which are leaning. 4,887,419, Cl. 56-319.000.
Bourbon, Robert M.: *See—*
Dean, Walter L.; Moore, Danny R.; Owens, James W.; Schoggen, Howard L.; Bourbon, Robert M.; and Cook, Jeffrey T., 4,888,093, Cl. 162-157.600.
Bouten, Hans: *See—*
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Bowe, Michael J.; and Wright, Alistair L., to United Kingdom Atomic Energy Authority. Fluidic apparatus. 4,887,628, Cl. 137-8.000.
Bowers, Derek F., to Precision Monolithics, Inc. Digital-to-analog converter with diode control. 4,888,589, Cl. 341-153.000.
Bowman, James A.; and Andrews, Ronald W., to Georgia Kaolin Company, Inc. High solids blended kaolin clay slurry. 4,888,315, Cl. 501-144.000.
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Jones, Howard; Lukacsko, Alison B.; Tencza, Thomas M.; Sarsfield, Beth A.; and Patel, Mahesh K., 4,888,343, Cl. 514-264.000.
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Bankstahl, Herbert A.; and Newman, Neil A., 4,887,983, Cl. 440-57.000.
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Abe, Shunichi, 4,888,636, Cl. 358-80.000.
Aoki, Kanemasa, 4,888,511, Cl. 310-237.000.
Arimoto, Shinobu, 4,888,492, Cl. 250-578.000.
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Nanamura, Masanori; Hosaka, Masao; and Inouye, Mutsuhiro, 4,888,616, Cl. 355-202.000.
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Tamura, Shuichi, 4,888,515, Cl. 310-323.000.
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Carella, Richard F. Training device for archery. 4,887,584, Cl. 124-90.000.

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Ceramics Process Systems Corporation: *See—*
Adams, Richard W.; and Wei, Wen-Cheng J., 4,888,313, Cl. 501-103.000.

Cernea, Raul-Adrian: *See—*
Wong, Ting-Wah; and Cernea, Raul-Adrian, 4,888,738, Cl. 365-218.000.

Cerny, John R., Jr.; Olson, Jay H.; Hall, James W.; and Erdman, Leon P., to Deere & Company. Modular mower deck with light-weight housing. 4,887,420, Cl. 56-320.200.

Cerveny, John G.: *See—*
Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., 4,888,191, Cl. 426-281.000.

Cerwin, Robert J.: *See—*
Roshdy, Constance E.; Cerwin, Robert J.; and Alpern, Marvin, 4,887,710, Cl. 206-63.300.

Cesare, Frank C.; Whelan, William P., Jr.; Petersen, Henno A.; Coolbaugh, Thomas S.; and Davis, Robert G., to Uniroyal Chemical Company, Inc. Carboxyl modified olefinic copolymer compositions. 4,888,393, Cl. 525-285.000.

Chaczyk, Adam W.; and Brown, Kelvin T., to Babcock Industries Inc. Manually controlled adjustable locking mechanism for a cable control system. 4,887,930, Cl. 403-379.000.

Chadwick, Kirk M.; Halm, Roland L.; and Keyes, Brian R., to Dow Corning Corporation. Integrated process for alkylation and redistribution of halosilanes. 4,888,435, Cl. 556-469.000.

Chaffoteaux Et Maury: *See—*
LeMer, Joseph, 4,887,963, Cl. 431-354.000.

Champion Spark Plug Company: *See—*
Nemeth, Joseph; and Kowalski, Charles I., 4,887,795, Cl. 252-511.000.

Chan, Gilbert Y. H.: *See—*
Hazel, Robert L.; and Chan, Gilbert Y. H., 4,888,759, Cl. 369-110.000.

Chan, Shufan: *See—*
Jenkin, Keith R.; and Chan, Shufan, 4,888,806, Cl. 381-35.000.

Chang, Keh-Minn, to General Electric Company. Method of forming strong fatigue crack resistant nickel base superalloy and product formed. 4,888,064, Cl. 148-2.000.

Chang, Peter; Bergman, Darrin J.; and Duda, Donald W., to Amphenol Corporation. Fiber optic connector for use in temporary repair of multiple fiber cable. 4,887,875, Cl. 350-96.210.

Chang, Yunik; and Patel, Dinesh C., to Theratech, Inc. Skin penetration enhancement using free base and acid addition salt combinations of active agents. 4,888,354, Cl. 514-424.000.

Chanroo, Keith A.; and Steel, Francis R., deceased (by Steel, Lynne A., legal representative), to Motorola, Inc. Phase correcting DPSK/PSK receiver with digitally stored phase correction derived from received data. 4,888,793, Cl. 375-84.000.

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Diot, Jean-Claude; and Girardin, Roger, 4,888,462, Cl. 219-69.200.

Charpin, Jean; Grangeon, Andre ; Pejot, Francis; Plurien, Pierre; Rasneur, Bernard; Richard, Serge; and Veyre, Rene , to Commissariat A L'Energie Atomique. Method of manufacturing permeable mineral membranes. 4,888,033, Cl. 55-158.000.

Chase, Charles J., to Lockhead Corporation. Aircraft runway. 4,888,590, Cl. 342-3.000.

Chattin, Jesse R. Gear Mechanism for compound bow. 4,887,582, Cl. 124-23.00R.

Chellapa, Karumpatti L.; and Shah, Mukund C., to Witco Corporation. New flame retardant compositions of matter and cellulosic products containing same. 4,888,136, Cl. 252-607.000.

Chemical Products Corporation: *See—*
Adams, Charles, Jr.; and Cook, Jerry A., 4,888,161, Cl. 423-430.000.
Adams, Charles, Jr.; and Cook, Jerry A., 4,888,308, Cl. 501-11.000.

Chen, Ih-Chin; Shen, Bing W.; Bohlman, James G.; and Tsai, Hun-Lian, to Texas Instruments Incorporated. Stacked insulating film including yttrium oxide. 4,888,820, Cl. 361-313.600.

Chenoweth, Vaughn C.; and Goodsell, Robert C., to Guardian Industries Corporation. Improved non-woven fibrous product. 4,888,235, Cl. 428-283.000.

Chesarek, Richard H., to Quantum Medical Systems, Inc. Ultrasound imaging system for relatively low-velocity blood flow at relatively high frame rates. 4,888,694, Cl. 364-413.240.

Chesebrough-Pond's Inc.: *See—*
Schlameus, Herman W.; Lew, Chel W.; and Atkinson, Donald M., 4,888,140, Cl. 264-4.300.

Chevet, Bruno: *See—*
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Chevillard, Paul F.: *See—*
Tritton, Victor R.; Tritton, Gary E.; and Chevillard, Paul F., 4,887,855, Cl. 292-307.00R.

Chiang, William G.: *See—*
Reimschuessel, Herbert K.; Chiang, William G.; and Tichenor, George J. W., 4,888,396, Cl. 525-379.000.

Chiao, Stephen S.: *See—*
Lee, Wung K.; and Chiao, Stephen S., 4,888,734, Cl. 365-185.000.
Lee, Wung K.; and Chiao, Stephen S., 4,888,735, Cl. 365-185.000.

Chiao, Wen B.; Iovine, Carmine P.; and Gold, Samuel, to National Starch and Chemical Corporation. Electroconductive coatings. 4,888,250, Cl. 428-514.000.

Chikamasa, Hiroshi: *See—*
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Child, Robin E., to Concentric Pumps Limited. Variable output oil pump. 4,887,956, Cl. 418-20.000.

Chiles III, Robert E.; Neville, Bruce R.; Wattis, Richard D.; and Werthmann, Scott, to AMF Bowling, Inc. Bowling scoring display system. 4,887,813, Cl. 273-54.00C.

Chilton, George A. A.: *See—*
Hart, Peter B.; Chilton, George A. A.; and Kirk, Richard A., 4,888,603, Cl. 346-160.000.

Chin, Arthur H.; and Taylor, William M., to Cameron Iron Works USA, Inc. Subsea tubular joint. 4,887,846, Cl. 285-18.000.

Chin, Stephen: *See—*
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Chism, Wayne R., to Hewlett-Packard Company. Programmatically generated in-circuit test of digital to analog converters. 4,888,548, Cl. 324-73.00R.

Chisso Corporation: *See—*
Matsuda, Minoru; Itoh, Seiki; and Ono, Hiroshi, 4,888,392, Cl. 526-279.000.

Chonan, Yoshiya, to Sakae Ringyo Co., Ltd. Fixing structure of fork stem and fork shoulder. 4,887,828, Cl. 280-280.000.

Christ, F. Richard: *See—*
Ting, Albert C.; Willis, Timothy R.; Christ, F. Richard; Bacich, Steven R.; Pettit, Dean K.; Van Gent, Stanley L.; and Day, Jeffrey C., 4,888,013, Cl. 623-6.000.

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Christianson, Roy O.; and Christianson, Frank W., to Christianson Systems, Inc. Cyclone separator with accelerator plate for pneumatic conveyor. 4,887,936, Cl. 406-171.000.

Christianson Systems, Inc.: *See—*
Christianson, Roy O.; and Christianson, Frank W., 4,887,936, Cl. 406-171.000.

Chrysler Motors Corporation: *See—*
Holbrook, Gerald L.; and Leising, Maurice B., 4,887,491, Cl. 74-866.000.
Leising, Maurice B.; and Kuusik, Uno, 4,887,512, Cl. 91-471.000.
Sway-Tin, Min; Merchant, Daniel P.; and Mangliers, Thomas J., 4,888,637, Cl. 357-81.000.
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Chu, George; Nathan, Ranga; and Seyedin, Saeid, to Collagen Corporation. Inductive collagen-based bone repair preparations. 4,888,366, Cl. 523-115.000.

Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, to Advanced Micro Devices, Inc. Content addressable memory array system with multiplexed status and command information. 4,888,731, Cl. 365-49.000.

Chushenkov, Igor M.: *See—*
Dimitrov, Dimith T.; Matjukhina, Ljudimila I.; Mikhalev, Alexandr S.; and Chushenkov, Igor M., 4,888,538, Cl. 318-675.000.

Chwalisz, Krzysztof: *See—*
Elger, Walter; Beier, Sybille; Fahnrich, Marianne; Kosub, Beate; Chwalisz, Krzysztof; and Hasan, Syed H., 4,888,331, Cl. 514-170.000.

Ciba-Geigy Corporation: *See—*
Ehrenfreund, Josef; Boger, Manfred; Kristiansen, Odd; Drabek, Jozef; and Kristinsson, Haukur, 4,888,348, Cl. 514-367.000.
Odorisio, Paul A.; and Pastor, Steven D., 4,888,423, Cl. 544-238.000.
Ravichandran, Ramanathan; and Pastor, Stephen D., 4,888,444, Cl. 564-300.000.
Roth, Martin; Flury, Peter; and Eldin, Sameer H., 4,888,402, Cl. 526-262.000.

Cichanowicz, Peggy W.; and Belly, Robert T., to Eastman Kodak Company. Rapid differentiation of fungi from bacteria using polyene antibiotics. 4,888,287, Cl. 435-34.000.

Cincinnati Microwave, Inc.: *See—*
Allen, Paul M., 4,887,753, Cl. 224-312.000.

Cizaire, Ivan. Bottle stand. 4,887,726, Cl. 211-74.000.

Clapp, William L.: *See—*
Bernasek, Edward; Bridle, Kenneth A.; Clapp, William L.; and Fagg, Barry S., 4,887,618, Cl. 131-297.000.

Clark, Brian; Uken, William D.; Schoenstein, Paul; and Camin, Geary, to Raychem Corporation. Environmental sealing of a substrate. 4,888,070, Cl. 156-48.000.

Clasen, Rolf, to U.S. Philips Corporation. Method of manufacture of glass bodies. 4,888,036, Cl. 65-18.100.

Clemence, Francois; Le Martret, Odile; Fortin, Michel; and Delevallee, Francoise, to Roussel Uclaf. Indanes and their use as antiarrhythmic agents. 4,888,355, Cl. 514-429.000.

Clemens, Donald F.: *See—*
Whitehurst, Brooks M.; Whitehurst, Garnett B.; and Clemens, Donald F., 4,888,421, Cl. 536-121.000.

Cleveland Clinic Foundation, The: *See—*
DeVore, Richard A.; and Kinney, Sam E., 4,888,017, Cl. 623-10.000.

Cleveland Container Corporation: *See—*
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Cloutier, Hermel R. Flexible counterweight system for overhead doors and like installations having removable weights. 4,887,658, Cl. 160-190.000.

Coal Industry (Patents) Limited: *See—*
Cann, Robert J., 4,887,336, Cl. 24-37.000

Cockerham, Kevin; and Packwood, Simon W., to Lucas Industries plc. Knock detection system. 4,887,456, Cl. 73-35.000.

Codenoll Technology Corporation: *See—*
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Codrington, Robert S., to Varian Associates, Inc. Multiple FIFO NMR acquistion system. 4,888,553, Cl. 324-312.000.

Cogent Limited: *See—*
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Cohen, Robert C.: *See—*
Averill, Robert G.; and Cohen, Robert C., 4,888,023, Cl. 623-22.000.

Colbert, Brian S. Snack pack opener. 4,887,355, Cl. 30-2.000.

Cole, Jacqueline M.: *See—*
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Cole, Malcolm P., Jr., to Methodist Hospital System, The. Apparatus and method for filtering electrocardiograph signals. 4,887,609, Cl. 128-696.000.

Cole, Steven J.: *See—*
Boyer, Scott M.; Cole, Steven J.; Gauvin, Roger A.; and Mitchell, Joe C., 4,887,754, Cl. 224-319.000.

Coleco Industries, Inc.: *See—*
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Colgate-Palmolive Co.: *See—*
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Collagen Corporation: *See—*
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Colt Industries, Inc.: *See—*
Woodcock, William F.; Ruhig, William E., Jr.; and Kline, Loren H., 4,887,578, Cl. 123-519.000.

Columbia University in the City of New York, The Trustees of: *See—*
Prucnal, Paul R.; Elby, Stuart DS.; and Harstead, Edward E., 4,887,879, Cl. 350-96.150.

Colvin, Robert D.: *See—*
Bottomley, Robin C.; Colvin, Robert D.; and Van Blanton, Madison, 4,888,184, Cl. 426-41.000.

Combustion Engineering, Inc.: *See—*
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Cominco Electronic Materials Inc.: *See—*
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Cominco Ltd.: *See—*
Bollong, Alan B. I.; Bult, Roelof P.; and Proux, Gary T., 4,888,051, Cl. 75-10.110.

Command Automation, Inc.: *See—*
Simjian, Luther G., 4,887,836, Cl. 280-651.000.

Commissariat A L'Energie Atomique: *See—*
Charpin, Jean; Grangeon, Andre ; Pejot, Francis; Plurien, Pierre; Rasneur, Bernard; Richard, Serge; and Veyre, Rene , 4,888,033, Cl. 55-158.000.
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Compagnie D'Electronique et de Piezo-Electricite C.E.P.E.: *See—*
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Compagnie Oris Industrie S.A.: *See—*
Gounelle, Gilbert; Nicaise, Maryvonne; and Tran, Kifu O., 4,888,019, Cl. 623-18.000.

Compton, Richard A.: *See—*
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Conanan, Virgilio D., to Home Box Office, Inc. Method and apparatus for determining earth station parameters such as rain margin, with attenuation pads. 4,888,596, Cl. 343-703.000.

Conbraco Industries, Inc.: *See—*
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Concentric Pumps Limited: *See—*
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Conemac, Timothy D. Wireless electronic alarm for installation in sliding door or window casings. 4,888,578, Cl. 340-546.000.

Confalonieri, Pierangelo: *See—*
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Conover, George E.: *See—*
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Consiglio Nazionale Delle Ricerche: *See—*
Bertini, Vincenzo; De Munno, Angela; Lucchesini, Francesco; Buffoni, Franca; and Bertocci, Barbara, 4,888,283, Cl. 435-184.000.

Consonni, Pietro: *See—*
Omodei-Sale', Amedeo; Consonni, Pietro; and Galliani, Giulio, 4,888,350, Cl. 514-384.000.

Contos, Simos, to Istituto Biochimico Sperimentale Ibis S.P.A. Analgesic and antiinflammatory pharmaceutical composition containing a naphthyl-acetic acid derivative. 4,888,359, Cl. 514-569.000.

Cook, Jeffrey T.: *See—*
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Cook, Jerry A.: *See—*
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Coolbaugh, Thomas S.: *See—*
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Cooley, Judith; and Douglas, Diane, to Brady Enterprises Inc. Method for producing flavored popcorn. 4,888,186, Cl. 426-99.000.

Cooney, Henry G., to NCR Corporation. System and method for providing for secure encryptor key management. 4,888,802, Cl. 380-49.000.

Cooper, Gerald. System for and method of photocatalytically modifying a chemical composition and method of constructing a panel utilized in the system and the method. 4,888,101, Cl. 204-157.150.

Cooper Industries, Inc.: *See—*
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Copley, Stephen M.: *See—*
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Corning Incorporated: *See—*
DeAngelis, Thomas P.; Lachman, Irwin M.; and Wusirika, Raja R., 4,888,317, Cl. 502-60.000.

Costanzi, Silvestro: *See—*
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Coulter Corporation: *See—*
Kortright, Kenneth H.; Hofheinz, David E.; Sullivan, Carole; and Toedter, Gary P., 4,888,290, Cl. 435-240.270.

Coulter Electronics, Inc.: *See—*
Proni, Oscar; Fayer, Ervin; Dominick, George G.; and Cambareri, Carmelo R., 4,887,473, Cl. 73-864.350.

Cowan, James J., to Polaroid Corporation. Volume phase reflection holograms and methods for fabricating them. 4,888,260, Cl. 430-1.000.

Cowan, Wavell; and McGurk, Stanley, to Inotech Process Ltd. Roll press for removing water from a web of paper using solid grooved roll and compressed air. 4,888,096, Cl. 162-358.000.

Cowburn, David; Rawlings, Stephen P.; and Pollard, Andrew, to GKN Technology Limited. Vehicle suspension. 4,887,841, Cl. 280-719.000.
Crack, David J., to Morse Controls Limited. Remote control mechanisms. 4,887,481, Cl. 74-500.500.
Crane, Jack W.; Anstee, L. Lavern; VanGinhoven, Robert M.; and Jennings, Richard E., to Ford New Holland, Inc. Timing belt for disc cutterbars. 4,887,416, Cl. 56-13.600.
Crane, Jacob; Johnson, Barry C.; Mahulikar, Deepak; and Butt, Sheldon H., to Olin Corporation. Semiconductor package. 4,888,449, Cl. 174-52.400.
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Hunt, Timothy J.; and Craske, Hadyn L., 4,887,698, Cl. 188-325.000.
Crea, Roberto, to Creative BioMolecules, Inc. Production of gene and protein analogs through synthetic gene design using double stranded synthetic oligonucleotides. 4,888,286, Cl. 435-172.300.
Creation de Mecanismes, d'Automatismes et d'Asservissements: *See—*
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Creative BioMolecules, Inc.: *See—*
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Crinquette, Jean-Marie; and Long, Jacques, to Societe anonyme dite: Alcatel Cit. Method and apparatus for starting series-coupled vacuum pumps. 4,887,941, Cl. 417-2.000.
Crum, Stephen T.: *See—*
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Cullum, Dennis, to Eastman Kodak Company. High speed video tape duplicator. 4,888,653, Cl. 360-15.000.
Cuneo, Andrew A., Jr.: *See—*
Berry, Mark D.; Brisker, Henry C.; and Cuneo, Andrew A., Jr., 4,888,546, Cl. 324-64.000.
Cunnane, Francis J., to Asten Group, Inc. Method for making a multilayered papermakers fabric with seam. 4,887,648, Cl. 139-383.00H.
Cuno, Incorporated: *See—*
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Curtis, Jeff: *See—*
Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 4,888,098, Cl. 204-1.00R.
Curtiss, Roy, III, to Research Corporation. Vaccines obtained from antigenic gene products of recombinant genes. 4,888,170, Cl. 424-93.000.
Cuscurida, Michael: *See—*
Klein, Howard P.; and Cuscurida, Michael, 4,888,446, Cl. 564-478.000.
Cutright, James W., to Homer Laughlin China Company, The. One-fire underglaze decal system. 4,888,230, Cl. 428-195.000.
Cwielong, Heinrich; Mertens, Wilfried; and Merten, Gerhard, to Gewerkschaft Eisenhutte Westfalia GmbH. Drive assemblies for chain-driven mining machinery. 4,887,991, Cl. 474-92.000.
Cypress Semiconductor Corporation: *See—*
Frederick, Bruce; and Keswick, Paul, 4,888,739, Cl. 365-221.000.
Cysewski, Jerome. Gate assembly. 4,887,393, Cl. 49-385.000.
Daamen, Jacobus T.; and Huizinga, Tom, to Shell Oil Company. Silica-alumina extrudates. 4,888,319, Cl. 502-235.000.
Da Col, Diego, to Da Col, Diego. Structural glazing system. 4,887,402, Cl. 52-235.000.
Daeges, Johannes; and Van Der Linden, Klaus, to Siemens Aktiengesellschaft. Piezoelectrically excitable resonance system. 4,888,516, Cl. 310-323.000.
D'Agostino, Saverio A.: *See—*
Longerich, Ernest P.; and D'Agostino, Saverio A., 4,888,663, Cl. 361-385.000.
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Dahlgren, Lennart. Periscope with one piece housing and mirror holding elements. 4,887,893, Cl. 350-618.000.
Daicho, Hiroyuki: *See—*
Umehara, Teruo; Daicho, Hiroyuki; and Taketomi, Seiki, 4,888,506, Cl. 310-13.000.
Daicolo Co., Ltd.: *See—*
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Takei, Toshio; and Tanaka, Toshio, 4,888,422, Cl. 540-135.000.
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Dainty, Robin K., to British Gas plc. Rack arrangement. 4,887,750, Cl. 224-42.110.
Dakin, John P.; and Pratt, David J., to Plessey Overseas Limited. Optical sensing arrangements with wavelength and time-displacement detection. 4,888,480, Cl. 250-226.000.
Dale, Albie A.: *See—*
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Dallabora, Marco; Gastaldi, Roberto; and Novosel, David, to SGS Thomson Microelectronics spa. Generator of reset pulses upon the rise of the power supply for CMOS-type integrated circuits. 4,888,497, Cl. 307-272.300.
Dallaire, Michel; and Katz, Robert, to St. Lawrence Manufacturing Canada, Inc. Telescopic golf cart. 4,887,835, Cl. 280-646.000.
Dall'Osso, Gastone: *See—*
Mattei, Riccardo; and Dall'Osso, Gastone, 4,887,408, Cl. 53-412.000.
D'Alo, Herbert F.; and Enger, Christine D., to Sherwood Medical Company. Vented spike connection component. 4,888,008, Cl. 604-411.000.
Dalo, Jean: *See—*
Dalo, Pierre; and Dalo, Jean, 4,887,626, Cl. 135-119.000.
Dalo, Pierre; and Dalo, Jean. Stretched cloth fixing device. 4,887,626, Cl. 135-119.000.
Daly, John Kevin: *See—*
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Damon, Neil F.; and Senor, Ronald E., to Augat Inc. Electronic socket carrier system. 4,887,981, Cl. 439-885.000.
Dana Corporation: *See—*
Hoff, Steven R.; and Zuber, Larry L., 4,887,451, Cl. 72-402.000.
Zackrisson, Barry L.; and Beckman, John A., 4,888,224, Cl. 428-35.900.
Dana-Farber Cancer Institute, Inc.: *See—*
Lambert, John M.; Blattler, Walter A.; and Senter, Peter D., 4,888,415, Cl. 530-390.000.
Dandeneau, James V. Method and apparatus of forming extruded article. 4,888,146, Cl. 264-171.000.
Daniel, Richard A.: *See—*
Sanwo, Ikuo J.; Simeral, John D.; and Daniel, Richard A., 4,888,501, Cl. 307-475.000.
Daniels, Darleen. Unitary contiguous face and neck protector all weather cover for hard head gear. 4,887,319, Cl. 2-410.000.
Darbut, Alexander L.; and Ralph, Vernon C., to Honeywell Inc. Undersea wet-mateable fiber optic connector. 4,887,883, Cl. 350-96.210.
Dart Controls, Inc.: *See—*
Penn, Paul E.; and Grissom, Gary R., 4,888,813, Cl. 388-838.000.
Data, Harry L.: *See—*
Klees, David A.; Hoganson, Robert B.; and Data, Harry L., 4,887,422, Cl. 57-220.000.
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Fossum, Tryggve; Hetherington, Ricky C.; Fite, David B., Jr.; Manley, Dwight P.; McKeen, Francis X.; and Murray, John E., 4,888,679, Cl. 364-200.000.

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Farquharson, Richard A.; and Mitchell, Edwina B., 4,888,174, Cl. 424-405.000.
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Edward., James R. Valve actuation system for desmodromic internal combustion engines. 4,887,564, Cl. 123-90.250.
Edwards, John G., to Alcon Laboratories, Inc. Topical antibiotic compositions. 4,888,327, Cl. 514-41.000.
Edwards, John W. Convertible hitch for mobile equipment. 4,887,831, Cl. 280-416.300.
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Ishiwaka, Takumi; Andoh, Yukio; Yamaguchi, Michiyuki; Suzuki, Shosuke; Egashira, Yoshinori; Yokobori, Takeo; and Ohashi, Takashi, 4,887,923, Cl. 400-659.000.
Eggers, Detlev, to Metallgesellschaft Aktiengesellschaft. Apparatus for treating the inside surface of tubular members with liquid. 4,887,624, Cl. 134-98.000.
Egozi, Avihai; and Stokar, Saul, to Elscint Ltd. Magnetic resonance imaging. 4,888,552, Cl. 324-309.000.
Eguchi, Yoshio: *See—*
Ohsugi, Hiroharu; Eguchi, Yoshio; Urano, Satoshi; Mizuguchi, Ryuzo; and Takarada, Mitsuhiro, 4,888,406, Cl. 528-32.000.
Eheim, Franz, executor: *See—*
Eheim, Helga, deceased; and Eheim, Franz, executor, 4,887,571, Cl. 123-367.000.
Eheim, Helga, deceased; and by Eheim, Franz, executor. Speed governor for fuel injection pumps. 4,887,571, Cl. 123-367.000.
Ehob, Inc.: *See—*
Spahn, James G.; Langley, Steven P.; and Jacobs, Michael L., 4,887,715, Cl. 206-370.000.
Ehrenfreund, Josef; Boger, Manfred; Kristiansen, Odd; Drabek, Jozef; and Kristinsson, Haukur, to Ciba-Geigy Corporation. Substituted thioureas, isothioureas and carbodiimides. 4,888,348, Cl. 514-367.000.
Ehrlich, Daniel J.: *See—*
Rothschild, Mordechai; Black, Jerry G.; and Ehrlich, Daniel J., 4,888,203, Cl. 427-53.400.
Ehrman, Albert M.; Seiden, Paul; Weitzel, Rose M.; and White, Robert L., to Procter & Gamble Company, The. Process for tempering flavored confectionery compositions containing reduced calorie fats and resulting tempered products. 4,888,196, Cl. 426-601.000.
Eicken, Karl: *See—*
Rueb, Lothar; Eicken, Karl; Zeeh, Bernd; Meyer, Norbert; and Wuerzer, Bruno, 4,888,046, Cl. 71-90.000.
Eisai Co., Ltd.: *See—*
Yamatsu, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Murakami, Manabu; Oketani, Kiyoshi; and Fujisaki, Hideaki, 4,888,439, Cl. 560-129.000.
Eka Nobel AB: *See—*
Welander, Bo C.; Ohlin, Tommy C. K.; and Jarvis, Ronald P., 4,888,099, Cl. 204-95.000.
Elby, Stuart DS.: *See—*
Prucnal, Paul R.; Elby, Stuart DS.; and Harstead, Edward E., 4,887,879, Cl. 350-96.150.
Eldin, Sameer H.: *See—*
Roth, Martin; Flury, Peter; and Eldin, Sameer H., 4,888,402, Cl. 526-262.000.
Electric Eel Manufacturing Co., Inc.: *See—*
Hale, C. David, 4,887,929, Cl. 403-328.000.
Electricite de France: *See—*
Feron, Paul; and Tougne, Daniel, 4,888,495, Cl. 307-39.000.
Electronic Control Systems, Inc.: *See—*
King, Lael D., 4,887,684, Cl. 180-179.000.
Elger, Walter; Beier, Sybille; Fahnrich, Marianne; Kosub, Beate; Chwalisz, Krzysztof; and Hasan, Syed H., to Schering Aktiengesellschaft. Coadministration of antigestagen and antiestrogen for gynecological disorders, abortion and labor induction. 4,888,331, Cl. 514-170.000.
Eli Lilly and Company: *See—*
Hertel, Larry W.; Morin, John M., Jr.; and Vasileff, Robert T., 4,888,100, Cl. 204-157.700.
Elite Semiconductor & Systems Int'l., Inc.: *See—*
Lee, Wung K.; and Chiao, Stephen S., 4,888,734, Cl. 365-185.000.
Lee, Wung K.; and Chiao, Stephen S., 4,888,735, Cl. 365-185.000.
ELITEX koncern textilniho strojirenstvi: *See—*
Jelinek, Jan, 4,887,440, Cl. 66-145.00S.
Ellis-Brown, Roy, to International Seafood Engineering, Inc. Shrimp cooking apparatus. 4,887,524, Cl. 99-443.00C.
Ellis, Paul: *See—*
Smith, Gerald J.; Trask, Elwood G.; Ellis, Paul; Johnston, Jon; Campbell, Brian; and Rorie, Leon, 4,888,234, Cl. 428-234.000.
Ellison, Donald E.: *See—*
Ratke, Richard; and Ellison, Donald E., 4,887,702, Cl. 192-4.00A.
Ellison, Kathleen: *See—*
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.
Elscint Ltd.: *See—*
Egozi, Avihai; and Stokar, Saul, 4,888,552, Cl. 324-309.000.
Emerson Electric Co.: *See—*
Bowsky, Benjamin, 4,888,039, Cl. 65-139.000.
Emhart Industries Inc.: *See—*
Andersen, Robert P.; Scott, Paul F.; and Vozenilek, Edward F., 4,888,824, Cl. 324-61.00R.
Douglas, Robert J.; and Trahan, Albert J., 4,888,040, Cl. 65-3C7.000.
Lavelle, Gary E., 4,887,442, Cl. 70-143.000.
Empi, Inc.: *See—*
Morawetz, Peter L.; and Ioffe, Zosim, 4,887,603, Cl. 128-422.000.
Enari, Masahiko; Aoki, Akio; Matsushita, Machiko; Matsuoka, Hiroshi; and Minoura, Kazuo, to Canon Kabushiki Kaisha. Information recording medium capable of accurately detecting the recording and reproduction starting positions and an information recording-reproducing method and apparatus therefor. 4,888,753, Cl. 369-44.000.
Endoh, Minoru: *See—*
Tokunaga, Masaaki; Endoh, Minoru; Meguro, Noriaki; and Tanigawa, Shigeho, 4,888,068, Cl. 148-104.000.
Enger, Christine D.: *See—*
D'Alo, Herbert F.; and Enger, Christine D., 4,888,008, Cl. 604-411.000.
Enichem Sintesi S.p.A.: *See—*
Greco, Alberto; Cassar, Luigi; Costanzi, Silvestro; and Neri, Carlo, 4,888,375, Cl. 524-262.000.
Eniricerche S.p.A.: *See—*
Pedretti, Ugo; Bonfanti, Cesarina; Montani, Enrico; Hakemi, Hassan A.; and Roggero, Arnaldo, 4,888,409, Cl. 528-129.000.
Enokimoto, Akito; Hosoya, Eiji; Kasa, Keiji; Handa, Akio; Ishiwatari, Makoto; and Mizumoto, Kousei, to Honda Giken Kogyo Kabushiki Kaisha. Off-road vehicle. 4,887,844, Cl. 280-779.000.
Enomoto, Hiromu; Yasuda, Yasushi; Shimauchi, Yoshiki; and Tahara, Akinori, to Fujitsu Limited. Semiconductor device with PN junction isolation for TTL or ECL circuits. 4,888,623, Cl. 357-15.000.
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, to Sumitomo Chemical Company, Limited. Benzothiazolones, and their production and use. 4,888,045, Cl. 71-90.000.
Enomoto, Toshihiko; Nakashima, Yasuo; Watanabe, Takashi; Komai, Takao; and Mochizuki, Tatsuya, to Mitsubishi Denki Kabushiki Kaisha. Defrosting system for a heat exchanger. 4,887,436, Cl. 62-155.000.
Epperly, William R.; and Sullivan, James C., to Fuel Tech, Inc. Process for the reduction of nitrogen oxides in an effluent using a heterocyclic hydrocarbon. 4,888,165, Cl. 423-235.000.
Epstein, Joseph W.: *See—*
Tseng, Shin S.; Dusza, John P.; and Epstein, Joseph W., 4,888,345, Cl. 514-258.000.
Erbamont, Inc.: *See—*
Lednicer, Daniel; and Sun, Jung-Hui, 4,888,353, Cl. 514-422.000.
Erdman, Leon P.: *See—*
Cerny, John R., Jr.; Olson, Jay H.; Hall, James W.; and Erdman, Leon P., 4,887,420, Cl. 56-320.200.
Ermanco Incorporated: *See—*
Harms, Jeffrey, 4,887,707, Cl. 198-781.000.
Esco Precision, Inc.: *See—*
Esser, Theodor; and Doherty, Thomas E., 4,887,612, Cl. 128-751.000.
Escott, Suzanne. Airline ownership and travel game. 4,887,818, Cl. 273-254.000.
Eskilsson, Eva C.: *See—*
Appelgren, Curt H.; and Eskilsson, Eva C., 4,888,179, Cl. 424-480.000.
Esser, Peter D.: *See—*
Plummer, Steven J.; Ina, Antoine; Tipping, David L.; and Esser, Peter D., 4,888,486, Cl. 250-363.040.
Esser, Theodor; and Doherty, Thomas E., to Esco Precision, Inc. Endoscopic biopsy forceps. 4,887,612, Cl. 128-751.000.
Etablissements Caillau: *See—*
Calmettes, Lionel, 4,887,948, Cl. 411-5.000.
Estabrook, Robert M.; Furtmann, Terrence J.; and Norstrom, Svenn A., to Honeywell Inc. Clutch/damper. 4,888,539, Cl. 318-685.000.
Ethicon, Inc.: *See—*
Roshdy, Constance E.; Cerwin, Robert J.; and Alpern, Marvin, 4,887,710, Cl. 206-63.300.
Ethyl Corporation: *See—*
Laurenzo, Kathleen S., 4,888,138, Cl. 562-555.000.
Smith, Kim R., 4,888,447, Cl. 564-480.000.
Ethylene Corp.: *See—*
Sheridan, Michael, 4,888,154, Cl. 422-49.000.
Etoh, Yoshihiko: *See—*
Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,888,262, Cl. 430-58.000.
Eurotechnique: *See—*
Bergemont, Albert, 4,888,628, Cl. 357-23.600.
Evans, Alfred J.; and Dunigan, R. Clay, to Delaware Capital Formation, Inc. Semi-automatic stuffing machine, casing brake and turret assembly. 4,887,332, Cl. 17-35.000.
Evans, Donald: *See—*
Gibbons, Charles E.; Marano, Gerald A.; Kitrell, James M.; Whillock, Allan A.; Lanham, Robert L.; and Evans, Donald, 4,888,222, Cl. 428-34.200.
Evans, James: *See—*
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,888,324, Cl. 514-25.000.
Ewald, Jurgen; Frania, Josef; and Glogowschek, Roland, to WABCO Westinghouse Fahrzeugbremsen GmbH. Brake cylinder with bayonet connection. 4,887,513, Cl. 92-63.000.

Express Foods Group Limited: *See*—
Bottomley, Robin C.; Colvin, Robert D.; and Van Blanton, Madison, 4,888,184, Cl. 426-41.000.

Exxon Chemical Patents Inc.: *See*—
Domine, Joseph D.; and Buchner, Anton J., 4,888,391, Cl. 525-221.000.

Exxon Research and Engineering Company: *See*—
Goetsch, Duane A.; Say, Geoffrey R.; Vargas, Jose M.; and Eberly, Paul E., 4,888,131, Cl. 252-373.000.

FAG Kugelfischer Georg Schafer (KGaA): *See*—
Troster, Manfred; and Hofmann, Heinrich, 4,887,917, Cl. 384-543.000.

Fagg, Barry S.: *See*—
Bernasek, Edward; Bridle, Kenneth A.; Clapp, William L.; and Fagg, Barry S., 4,887,618, Cl. 131-297.000.

Fahnrich, Marianne: *See*—
Elger, Walter; Beier, Sybille; Fahnrich, Marianne; Kosub, Beate; Chwalisz, Krzysztof; and Hasan, Syed H., 4,888,331, Cl. 514-170.000.

Fairchild Camera and Instrument Corporation: *See*—
Burton, Gregory N., 4,888,300, Cl. 437-61.000.

Fairchild International Inc.: *See*—
Plumley, Roger D., 4,887,868, Cl. 299-57.000.

Falco, Lucien G.; and Parriaux, Olivier M., to Centre Suisse D'Electronique Et De Microtechnique S.A. Optical fiber detection system using an intensity-modulating sensor. 4,887,901, Cl. 356-352.000.

Falk, Edward K., to CDI Technologies, Inc. Surface detail mapping system. 4,888,713, Cl. 364-522.000.

Fansler, John D.: *See*—
Carnell. Brian L.; Fansler, John D.; and Pramanik, Mukunda B., 4,887,782, Cl. 244-234.000.

Farber, Jurgen, to PKL Verpackungssysteme GmbH. Package for liquid materials. 4,887,720, Cl. 206-621.200.

Farmer, James: *See*—
Mobley, Joseph G.; Kozushin, Anatoly; Baher, Saeed; Addison, Steve; Paulk, Howard; and Farmer, James, 4,888,799, Cl. 380-6.000.

Farnand, J. Redmond, to Canadian Patents and Development Limited. Separation of fine solids from petroleum oils and the like. 4,888,108, Cl. 208-424.000.

Farquharson, Richard A.; and Mitchell, Edwina B., to Dow Chemical Company, The. Insecticidal polymeric compositions. 4,888,174, Cl. 424-405.000.

Farr, Andrew F.; and Radisch, Herbert R., Jr., to Interventional Technologies Inc. Cutter for atherectomy device. 4,887,613, Cl. 606-159.000.

Farrar, Timothy J.: *See*—
Boyko, James G.; Farrar, Timothy J.; and Peterson, Stephen B., 4,887,390, Cl. 49-214.000.

Farrell, Eugene A.: *See*—
Robinson, Mark D.; and Farrell, Eugene A., 4,887,772, Cl. 241-92.000.

Fayer, Ervin: *See*—
Proni, Oscar; Fayer, Ervin; Dominick, George G.; and Cambareri, Carmelo R., 4,887,473, Cl. 73-864.350.

Feindel, Robert E.: *See*—
Klosterhaus, Edwin G.; and Feindel, Robert E., 4,887,683, Cl. 180-148.000.

Feller AG: *See*—
Rutimann, Peter, 4,887,881, Cl. 350-96.200.

Felts, John T.; and Lopata, Eugene S., to BOC Group, Inc., The. Plasma thin film deposition process. 4,888,199, Cl. 427-10.000.

Femcare Limited: *See*—
McQuillkin, Peter H.; and Lawrence, William T., 4,888,000, Cl. 604-164.000.

Fence Hardware Specialties, Inc.: *See*—
Bulten, Paul J., 4,887,854, Cl. 272-238.000.

Fenrich, William G.: *See*—
Hensel, Robert J.; and Fenrich, William G., 4,887,559, Cl. 123-73.0AD.

Fenton, Gary; and Huddle, Tom, to Trailmobile Inc. Integral false ceiling for refrigerated vehicles. 4,887,437, Cl. 62-186.000.

Fenton, Ronald L.; and Brandt, Robert. LP-Gas carburetion system apparatus and method. 4,887,579, Cl. 123-525.000.

Ferag AG: *See*—
Eberle, Jurg, 4,887,809, Cl. 271-203.000.

Feron, Paul; and Tougne, Daniel, to Manufacture d'Appareillage Electrique Cahors; and Electricite de France. Power adapter for electrical installations and especially domestic installations with so-called carrier current control. 4,888,495, Cl. 307-39.000.

Ferranti International Signal plc: *See*—
Wilson, Thomas B., 4,888,644, Cl. 358-209.000.

Ferrell, Clarence D.: *See*—
Dunlap, Kenneth L.; Markusch, Peter H.; and Ferrell, Clarence D., 4,888,442, Cl. 560-352.000.

Ferrosud S.p.A.: *See*—
Mangone, Angelo, 4,887,535, Cl. 105-3.000.

Fetcenko, Raymond M.; Wydro, Jan; and Zuponcic, Ralph P., to Nordson Corporation. Apparatus for adhesive transfer. 4,888,082, Cl. 156-500.000.

Field, Robert E.: *See*—
Auxier, Thomas A.; Rannie, James B.; and Field, Robert E., 4,887,663, Cl. 165-47.000.

Fikentscher, Rolf: *See*—
Ebel, Klaus; Reuther, Wolfgang; Fikentscher, Rolf; Lach, Dietrich; Streicher, Rolf; and Schaffer, Ortwin, 4,888,412, Cl. 528-230.000.

Filmtec Corp.: *See*—
Cadotte, John E.; and Schmidt, Donald L., 4,888,116, Cl. 210-636.000.

Fischer, Richard J.; and Swanson, Douglas J., to Gates Rubber Company, The. Base isolation pad. 4,887,788, Cl. 248-562.000.

Fite, David B., Jr.: *See*—
Fossum, Tryggve; Hetherington, Ricky C.; Fite, David B., Jr.; Manley, Dwight P.; McKeen, Francis X.; and Murray, John E., 4,888,679, Cl. 364-200.000.

Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., to UOP. Germanium-aluminum-phosphorus-oxide molecular sieve compositions. 4,888,167, Cl. 423-306.000.

Flaugher, Jeffrey R.: *See*—
Herrington, Richard A.; Flaugher, Jeffrey R.; Borer, John W.; Woodward, Alan C.; and Greenhalgh, Geoffrey, 4,888,038, Cl. 65-114.000.

Flexwatt Corporation: *See*—
Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G., 4,888,089, Cl. 156-644.000.

Flores, David P.; and Alei, Philip E., to Dow Chemical Company, The. Method for improving the bond strength of Saran polymers to polyamides. 4,888,249, Cl. 428-476.100.

Flowers, Charles V.; and Sass, Bernard J., to ITT Corporation. Method and apparatus for providing a unitary assembly of tubing and a terminating fitting. 4,887,853, Cl. 285-287.000.

Floyd, David: *See*—
Sundeen, Joseph E.; Floyd, David; and Lee, Ving G., 4,888,424, Cl. 544-288.000.

Flud, Sammy K.: *See*—
Hahn, Granville J.; and Flud, Sammy K., 4,887,907, Cl. 366-99.000.

Fluegel, Theodore D., to Sundstrand Corporation. Speed trimming integrated drive generator. 4,888,493, Cl. 290-4.00C.

Fluid Technology (Aust) Limited: *See*—
Down, Raymond L., 4,887,640, Cl. 137-564.500.

Fluoroware, Inc.: *See*—
Rossi, Alexander N.; and Sancen, Mario N., 4,888,473, Cl. 235-376.000.

Flury, Peter: *See*—
Roth, Martin; Flury, Peter; and Eldin, Sameer H., 4,888,402, Cl. 526-262.000.

Flyer, Eric G.; Krusing, Richard A.; and Moseley, Elmer L., to Honeywell Inc. Wire bond force calibration meter. 4,887,470, Cl. 73-862.680.

Flynn, Charles M., Jr.; and Carnahan, Thomas G. Recovery of arsenic from ores and concentrates. 4,888,207, Cl. 423-87.000.

Fogarty, John E., Jr., to Key Filters, Inc. Filtering device for thermoplastic material. 4,888,110, Cl. 210-106.000.

Folkmar, Jan, to ICE-PACK Service AG. Closure for closing plastic bags and the like. 4,887,335, Cl. 24-30.50R.

Fong, William: *See*—
Paik, Woo H.; Fong, William; Goerge, Ashok K.; and McCormick, John E., 4,888,592, Cl. 342-359.000.

Fontaine, Brian: *See*—
Amici, Francis R.; and Fontaine, Brian, 4,887,820, Cl. 273-323.000.

Fontaine, Pierre: *See*—
Richon, Dominique; De Pous, Olivier; and Fontaine, Pierre, 4,888,310, Cl. 501-92.000.

Ford Aerospace Corporation: *See*—
Nankivil, Donald B., 4,888,477, Cl. 250-201.000.

Ford New Holland, Inc.: *See*—
Crane, Jack W.; Anstee, L. Lavern; VanGinhoven, Robert M.; and Jennings, Richard E., 4,887,416, Cl. 56-13.600.

Forestier, Serge: *See*—
Lang, Gerard; Forestier, Serge; Hocquaux, Michel; Grollier, Jean-Francois; and Rosenbaum, Georges, 4,888,026, Cl. 8-405.000.

Forster, Gervase L., to Hepco Slide Systems Limited. Slide systems. 4,887,915, Cl. 384-57.000.

Forte, Mark R.; and Noiles, Douglas G., to Joint Medical Products Corporation. Knee and patellar prosthesis. 4,888,021, Cl. 623-20.000.

Fortin, Michel: *See*—
Clemence, Francois; Le Martret, Odile; Fortin, Michel; and Delevallee, Francoise, 4,888,355, Cl. 514-429.000.

Fossum, Tryggve; Hetherington, Ricky C.; Fite, David B., Jr.; Manley, Dwight P.; McKeen, Francis X.; and Murray, John E., to Digital Equipment Corporation. Method and apparatus using a cache and main memory for both vector processing and scalar processing by prefetching cache blocks including vector data elements. 4,888,679, Cl. 364-200.000.

Foster, James: *See*—
Nguyen, Dat T.; Veinot, Dwight E.; and Foster, James, 4,888,057, Cl. 106-18.120.

Foster, Robert I.; Pfeifer, Robert F.; and Mihm, Thomas J., Jr., to Motorola, Inc. Hierarchical key management system. 4,888,801, Cl. 380-21.000.

Foster Wheeler USA Corporation: *See*—
Banquy, David L., 4,888,130, Cl. 252-373.000.

Fought, Gerald E.; and Herrmann, Raymond J., to Invacare Corporation. Wheelchair with combined wheel lock and hill holder. 4,887,830, Cl. 280-304.100.

Fox, Henry L. Adjustable mouth prop. 4,887,965, Cl. 433-140.000.

Frania, Josef: *See*—
Ewald, Jurgen; Frania, Josef; and Glogowschek, Roland, 4,887,513, Cl. 92-63.000.

Franklin, Robert P., to Trans-World Marketing Corporation. T-divider bracket assembly. 4,887,783, Cl. 248-220.400.

Frantz, Joseph C.: *See—*
Brown, Albert L.; Frantz, Joseph C.; and Peetz, Richard H., 4,888,169, Cl. 424-92.000.

Fratta, Antonino. Reluctance electric machine having a decreased cross section of rotor ferromagnetic material. 4,888,513, Cl. 310-216.000.

Frederick, Bruce; and Keswick, Paul, to Cypress Semiconductor Corporation. First-in first-out buffer memory with improved status flags. 4,888,739, Cl. 365-221.000.

Freed, Mark L., to Noma Video Inc. Stringed musical instrument with magnetic pickups. 4,887,506, Cl. 84-727.000.

Freedman, Melvin S., to Avery International Corporation. Composite facestocks and liners. 4,888,075, Cl. 156-243.000.

Freitag, Dieter; Joswig, Thomas; Idel, Karsten; Fullmann, Heinz-Josef; and Muller, Friedemann, to Bayer Aktiengesellschaft. Flame-resistant polyamides. 4,888,370, Cl. 524-100.000.

French, Wilbur J., Jr.: *See—*
Burcham, Walter E., Jr.; and French, Wilbur J., Jr., 4,887,619, Cl. 131-305.000.

Fricke, Herbert; Strate, Klaus; Wilmes, Manfred; and Frikkee, Arian, to C. A. Weidmueller GmbH & Co. Electrical connector including light-conducting means. 4,887,876, Cl. 350-96.200.

Frie, Monika: *See—*
Stroech, Klaus; Frie, Monika; Bockmann, Klaus; Lurssen, Klaus; and Dutzmann, Stefan, 4,888,048, Cl. 71-92.000.

Fried, Bernard: *See—*
Letovsky, Howard; and Fried, Bernard, 4,887,967, Cl. 434-61.000.

Friedland, Bernard, to Kearfott Guidance and Navigation Corp. System for measuring the position of vibrating object. 4,888,705, Cl. 364-508.000.

Friedman, Joseph S.; King, John P.; and Pride, Joseph P., III, to Signal Science, Inc. Time difference of arrival geolocation method, etc. 4,888,593, Cl. 342-387.000.

Friedman, Morton L., to United States of America, National Aeronautics and Space Administration. Acquisition signal transmitter. 4,888,595, Cl. 342-457.000.

Friedrichs, Bernd, to Hewi Heinrich Wilke GmbH. Means for mounting hardware or fittings, especially shelves and holders. 4,887,787, Cl. 248-551.000.

Friend, Alden E.; and Dunham, Lawrence A., to ITT Corporation. Fire isolation device. 4,887,631, Cl. 137-74.000.

Frikkee, Arian: *See—*
Fricke, Herbert; Strate, Klaus; Wilmes, Manfred; and Frikkee, Arian, 4,887,876, Cl. 350-96.200.

Frisby, Raymond A.; and Conover, George E., to Baker Hughes Incorporated. Method and apparatus for towing subsea pipeline sections. 4,887,931, Cl. 405-171.000.

Frisco, Frank D.; Kadash, Raymond J.; and Silverman, Keith B., to Mobil Oil Corporation. Apparatus for reading height of measurement column. 4,887,903, Cl. 356-372.000.

Frohardt, Melvin W.; Hartz, Keith H.; and Hardee, Patrick C., deceased (by Hardee, Judy D., executrix), to Martin Marietta Corporation. Solar energy tracking structure incorporating wind spoilers. 4,887,589, Cl. 126-418.000.

Frommelt Industries, Inc.: *See—*
Kraus, Thomas J., 4,887,660, Cl. 160-265.000.
West, Floyd D., 4,887,659, Cl. 160-199.000.

Fry, Arthur C.: *See—*
Browning, Nigel; Fry, Arthur C.; Malpass, Robert L. H.; Matthews, Brian; and Peters, Michael S., 4,887,781, Cl. 244-190.000.

Fryer, Glenn E. Tunnel measuring apparatus and method. 4,888,720, Cl. 364-506.000.

Fuel Tech, Inc.: *See—*
Epperly, William R.; and Sullivan, James C., 4,888,165, Cl. 423-235.000.

Fuhrer, Jack S.: *See—*
Isnardi, Michael A.; Smith, Terrence R.; Fuhrer, Jack S.; and Roeder, Barbara J., 4,888,641, Cl. 358-141.000.

Fuji Electric Co., Ltd.: *See—*
Hikita, Hiroshi, 4,887,347, Cl. 29-602.100.

Fuji Pack Systems, Ltd.: *See—*
Takamura, Yoshiyuki, 4,887,412, Cl. 53-504.000.

Fuji Photo Film Co., Ltd.: *See—*
Iida, Shinobu; Fujiyama, Masaaki; Komine, Shigeo; and Yamada, Keisuke, 4,888,212, Cl. 427-130.000.
Itoh, Isamu; Ono, Mitsunori; and Inagaki, Yoshio, 4,888,268, Cl. 430-218.000.
Kakimi, Fujio; and Ishikawa, Shunichi, 4,888,265, Cl. 430-138.000.
Kawakami, Hiroshi; Igarashi, Akira; and Iwakura, Ken, 4,888,321, Cl. 503-208.000.
Kishida, Seiichiro; and Sato, Minoru, 4,888,272, Cl. 430-569.000.
Narang, Subhash C., 4,888,257, Cl. 429-192.000.
Oda, Kazutaka, 4,887,365, Cl. 34-60.000.
Ohga, Kunihiko; and Saeki, Keiso, 4,888,334, Cl. 503-214.000.
Ohishi, Hirohiko, 4,887,343, Cl. 29-445.000.
Okuzawa, Tugio, 4,888,617, Cl. 355-203.000.
Saito, Naoki; and Harada, Toru, 4,888,322, Cl. 503-215.000.
Shiraishi, Hisashi; Kimura, Tsutomu; and Hishinuma, Kazuhiro, 4,888,695, Cl. 364-413.130.
Sugiyama, Tuyoshi; Takeda, Hideo; Sato, Tsunehiko; and Chikamasa, Hiroshi, 4,887,623, Cl. 134-64.00R.
Yamamoto, Shohei, 4,888,612, Cl. 355-35.000.

Fuji Sangyo Co., Ltd.: *See—*
Imazu, Ryuzo, 4,888,780, Cl. 371-31.000.

Fuji Valve Co., Ltd.: *See—*
Shida, Toshimitsu, 4,887,566, Cl. 123-90.510.

Fujii, Yasuteru: *See—*
Takano, Teruhisa; Kurita, Hitoshi; Fujii, Yasuteru; Suenaga, Haruo; and Yano, Masashi, 4,888,461, Cl. 219-10.55B.

Fujino, Hitoshi; Sawada, Takamasa; Kobayashi, Hiroo; Ohuchi, Osamu; Yagi, Tadashi; and Hayakawa, Yasuyoshi, to Canon Kabushiki Kaisha. Process cartridge and image forming apparatus using the same. 4,888,620, Cl. 355-211.000.

Fujioka, Yasushi: *See—*
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,888,062, Cl. 136-258.000.

Fujioka, Yosihide: *See—*
Shoji, Kazuo; Fujioka, Yosihide; Harada, Shigeyuki; and Ohba, Toshihiro, 4,888,523, Cl. 315-169.300.

Fujisaki, Hideaki: *See—*
Yamatsu, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Murakami, Manabu; Oketani, Kiyoshi; and Fujisaki, Hideaki, 4,888,439, Cl. 560-129.000.

Fujisaki, Masaru: *See—*
Asai, Susumu; Sugimoto, Haruhide; Fujisaki, Masaru; Shigetomi, Tadatoshi; and Kobayashi, Hisatoshi, 4,887,687, Cl. 180-219.000.

Fujita, Teruo, to Mitsubishi Denki Kabushiki Kaisha. Focused-spot-position detection device for optical information recording and reproducing device. 4,888,757, Cl. 369-46.000.

Fujita, Yosuke: *See—*
Kuwata, Jun; Fujita, Yosuke; Tohda, Takao; Abe, Atsushi; and Matsuoka, Tomizo, 4,888,246, Cl. 428-432.000.

Fujitsu Limited: *See—*
Ando, Hisashige; Katsuyama, Makoto; and Sakuraba, Takahiro, 4,888,584, Cl. 340-747.000.
Arai, Shigeru, 4,888,752, Cl. 369-44.000.
Enomoto, Hiromu; Yasuda, Yasushi; Shimauchi, Yoshiki; and Tahara, Akinori, 4,888,623, Cl. 357-15.000.
Yagi, Takeshi; and Kobayashi, Kenzo, 4,888,792, Cl. 375-39.000.

Fujiwara, Yasuhiko; Abe, Toshiro; Hashimoto, Atsunori; Nakazawa, Shinsuke; Nagano, Masami; and Atago, Takeshi, to Hitachi, Ltd; and Nissan Motor Co., Ltd. Ignition timing adjusting apparatus for internal combustion engine. 4,887,573, Cl. 123-422.000.

Fujiyama, Masaaki: *See—*
Iida, Shinobu; Fujiyama, Masaaki; Komine, Shigeo; and Yamada, Keisuke, 4,888,212, Cl. 427-130.000.

Fukada, Takeshi: *See—*
Yamazaki, Shunpei; Suzuki, Kunio; Nagayama, Susumu; Inujima, Takashi; Abe, Masayoshi; Fukada, Takeshi; Kinka, Mikio; Kobayashi, Ippei; Shibata, Katsuhiko; Susukida, Masato; and Koyanagi, Kaoru, 4,888,305, Cl. 437-101.000.

Fukaya, Chikara: *See—*
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.

Fukuda, Ichio: *See—*
Sumi, Sigeo; Hamamura, Fumio; and Fukuda, Ichio, 4,888,083, Cl. 156-521.000.

Fukui, Hiroshi: *See—*
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.

Fukui, Kenji: *See—*
Nakazato, Hiroshi; Matsumura, Takashi; Akamatsu, Takahiro; and Fukui, Kenji, 4,887,904, Cl. 356-375.000.

Fukumoto, Yasuhiko: *See—*
Sakuma, Kazuhiro; Fukumoto, Yasuhiko; and Tomioka, Akihiro, 4,887,467, Cl. 73-517.00B.

Fukunaga, Yukio: *See—*
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,888,696, Cl. 364-424.050.

Fukushima, Naoto: *See—*
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,888,696, Cl. 364-424.050.

Fukutaka, Takashi: *See—*
Nozaka, Kenkichi; Kawahara, Yoshihiro; Fukutaka, Takashi; and Horie, Fumiharu, 4,887,680, Cl. 180-53.300.

Fukuyama, Kazuo: *See—*
Tanaka, Tadao; Mitsui, Takeshi; Takizawa, Shozo; and Fukuyama, Kazuo, 4,887,632, Cl. 137-117.000.

Fullmann, Heinz-Josef: *See—*
Freitag, Dieter; Joswig, Thomas; Idel, Karsten; Fullmann, Heinz-Josef; and Muller, Friedemann, 4,888,370, Cl. 524-100.000.

Funato, Kenji: *See—*
Ishibashi, Akira; Funato, Kenji; and Mori, Yoshifumi, 4,888,622, Cl. 357-5.000.

Furtmann, Terrence J.: *See—*
Estabrook, Robert M.; Furtmann, Terrence J.; and Norstrom, Svenn A., 4,888,539, Cl. 318-685.000.

Furumoto, Horace: *See—*
Watson, Graham; and Furumoto, Horace, 4,887,600, Cl. 606-128.000.

Furuse, Akio, to Kubushiki Kaisha Kosumo Keiki. Volume measuring apparatus and method. 4,888,718, Cl. 364-564.000.

Furuya, Yukitsuna; and Akashi, Fumio, to NEC Corporation. Repeat request signal transmission method for multi-station packet communication. 4,888,767, Cl. 370-95.200.

G. D. Searle and Company: *See*—
Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., 4,888,356, Cl. 514-456.000.
G.D. Societa Per Azioni: *See*—
Mattei, Riccardo; and Dall'Osso, Gastone, 4,887,408, Cl. 53-412.000.
Gaddis, Joseph L.; and Jernigan, Daniel A., to Du Pont de Nemours, E. I., and Company. Sintered coating for porous metallic filter surfaces. 4,888,114, Cl. 210-500.250.
Gaidis, James M.: *See*—
Rosenberg, Arnold M.; Gaidis, James M.; and Kindt, Lawrence J., 4,888,058, Cl. 106-98.000.
Gajdzinski, Jerzy: *See*—
Hyde, James S.; and Gajdzinski, Jerzy, 4,888,554, Cl. 324-316.000.
Galarraga, Carmen E.: *See*—
Ramirez de Aqudelo, Magdalena M.; and Galarraga, Carmen E., 4,888,104, Cl. 208-112.000.
Gallacher, Lawrence V.: *See*—
Calbo, Leonard J., Jr.; and Gallacher, Lawrence V., 4,888,441, Cl. 560-198.000.
Gallant, William E., to Borden, Inc. Harvesting, shucking and eviscerating clams at sea. 4,887,333, Cl. 17-74.000.
Galliani, Giulio: *See*—
Omodei-Sale', Amedeo; Consonni, Pietro; and Galliani, Giulio, 4,888,350, Cl. 514-384.000.
Galosky, David G.; and Lougheed, Victor r. Cartridge operated fire extinguisher. 4,887,674, Cl. 169-61.000.
Gamon, Norbert; Solbrig, Christian; and Braunsperger, Karl, to Wacker-Chemie GmbH. Preparation and processing of mixtures containers organocyclosiloxanes. 4,888,405, Cl. 528-23.000.
Gandini, Luigi, to Dosa-Pack S.R.L. Process and apparatus for the production of packages of cosmetic products with powders of different characteristics. 4,887,410, Cl. 53-436.000.
Ganser, Hans-Gunther; Schafer, Ralf; and Stormberg, Hans-Peter. Circuit for operating gas discharge lamps with a periodically alternating lamp current. 4,888,524, Cl. 315-200.00R.
Gardner, Joseph P.: *See*—
Getson, Edward F., Jr.; Bradley, John W.; Gardner, Joseph P.; and Votolato, Alfred F., 4,888,727, Cl. 364-900.000.
Gardner, Lloyd E.; and Kidd, Dennis R., to Phillips Petroleum Company. Preparation of hydrotreating catalyst from spent catalyst. 4,888,316, Cl. 502-20.000.
Garoche, Didier: *See*—
Grollier, Jean F.; and Garoche, Didier, 4,888,027, Cl. 8-423.000.
Garofalo, Giovanni, to AMF Incorporated. Swim fin provided with a self-shaping, fluid flow conveying and controlling canal-like member. 4,887,985, Cl. 441-64.000.
Gast, Robert L.; and Willits, Lyle V., to Textron, Inc. Fastener stem collection apparatus and method. 4,887,450, Cl. 72-391.000.
Gastaldi, Roberto: *See*—
Dallabora, Marco; Gastaldi, Roberto; and Novosel, David, 4,888,497, Cl. 307-272.300.
Gates Formed-Fibre Products, Inc.: *See*—
Smith, Gerald J.; Trask, Elwood G.; Ellis, Paul; Johnston, Jon; Campbell, Brian; and Rorie, Leon, 4,888,234, Cl. 428-234.000.
Gates Rubber Company, The: *See*—
Fischer, Richard J.; and Swanson, Douglas J., 4,887,788, Cl. 248-562.000.
Gatschmann, Klaus G.: *See*—
Ruppert, Heinrich W.; and Gatschmann, Klaus G., 4,887,617, Cl. 131-70.000.
Gauneus, Gilbert; Nicaise, Maryvonne; and Tran, Kifu O., to Compagnie Oris Industrie S.A. Articular prosthesis and its preparation process. 4,888,019, Cl. 623-18.000.
Gauvin, Roger A.: *See*—
Boyer, Scott M.; Cole, Steven J.; Gauvin, Roger A.; and Mitchell, Joe C., 4,887,754, Cl. 224-319.000.
Gay, Christopher J.: *See*—
Anderson, Frank E.; Gay, Christopher J.; Hightower, Scott A.; and Luton, Karen G., 4,888,600, Cl. 341-24.000.
Gazzarrini, Vinicio, to Solis S.R.L. Device with adhesive for the holding of thin textile articles. 4,887,858, Cl. 294-1.100.
Geddis, Michael E.: *See*—
Anderson, David S.; and Geddis, Michael E., 4,887,718, Cl. 206-611.000.
Geelen, Pierre M. L., to Geelen Techniek B.V. Device for cooling and/or drying bulk goods. 4,887,364, Cl. 34-57.00C.
Geelen Techniek B.V.: *See*—
Geelen, Pierre M. L., 4,887,364, Cl. 34-57.00C.
Gefvert, Herbert I. Sound reproduction system. 4,888,804, Cl. 381-24.000.
Geidel, Helmut; and Rohra, Alois, to Motoren- und Turbinen-Union Munchen GmbH. Propfan turbine engine. 4,887,424, Cl. 60-39.080.
Gellerman, Floyd R. Flight simulation control apparatus. 4,887,966, Cl. 434-45.000.
General DataComm, Inc.: *See*—
Bains, Kuldip S., 4,888,770, Cl. 370-110.100.
Boreland, Charles P., 4,888,722, Cl. 364-736.500.
General Dynamics Corp., Pomona Div.: *See*—
Nunally, Patrick O., 4,887,544, Cl. 118-50.000.
General Electric Company: *See*—
Acampora, Alfonse A.; and Bunting, Richard M., 4,888,640, Cl. 358-133.000.
Boden, Eugene P.; and Krabbenhoft, Herman O., 4,888,400, Cl. 525-462.000.
Chang, Keh-Minn, 4,888,064, Cl. 148-2.000.
Isnardi, Michael A.; Smith, Terrence R.; Fuhrer, Jack S.; and Roeder, Barbara J., 4,888,641, Cl. 358-141.000.
Nguyen, Van-Duc, 4,888,711, Cl. 364-522.000.
Pattanayak, Deva N.; and Baliga, Bantval J., 4,888,627, Cl. 357-23.400.
Puckette, Charles M., IV; and Saulnier, Gary J., 4,888,557, Cl. 329-341.000.
Shannon, Thomas G.; and Brunelle, Daniel J., 4,888,411, Cl. 528-199.000.
Stein, Judith; and Leonard, Tracey M., 4,888,382, Cl. 524-788.000.
Tam, Kwok C., 4,888,693, Cl. 364-413.160.
Traver, Frank J., 4,888,384, Cl. 524-862.000.
van der Meer, Roelof; and Yates, John B., III, 4,888,397, Cl. 525-391.000.
Vdoviak, John W., 4,887,425, Cl. 60-261.000.
Yassa, Fathy F., 4,888,719, Cl. 364-721.000.
Zweben, Carl H.; Mogle, Rodman A.; Rodini, Benjamin T., Jr.; and Thaw, Charles L., 4,888,247, Cl. 428-105.000.
General Hospital Corporation, The: *See*—
Watson, Graham; and Furumoto, Horace, 4,887,600, Cl. 606-128.000.
General Instrument Corporation: *See*—
Paik, Woo H.; Fong, William; Goerge, Ashok K.; and McCormick, John E., 4,888,592, Cl. 342-359.000.
General Mills, Inc.: *See*—
Anderson, David S.; and Geddis, Michael E., 4,887,718, Cl. 206-611.000.
General Motors Corporation: *See*—
Blasko, Raymond J., 4,888,453, Cl. 174-135.000.
Kellogg, George E., 4,887,537, Cl. 108-55.100.
Genet, Alain: *See*—
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Genji, Nobuo: *See*—
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Gentex Corporation: *See*—
Long, Richard J.; and Zaccone, Joseph J., 4,887,320, Cl. 2-424.000.
Georg Fischer AG: *See*—
Hauke, Wilhelm, 4,887,661, Cl. 164-55.100.
George, Paul L.; Waxman, David M.; Sybel, Randall T.; Mednick, Elliot H.; O'Brien, Kevin J.; and Spatara, Joseph M., to Prime Computer, Inc. Method for disk I/O transfer. 4,888,691, Cl. 364-300.000.
Georgia Kaolin Company, Inc.: *See*—
Bowman, James A.; and Andrews, Ronald W., 4,888,315, Cl. 501-144.000.
Georgia Tech Research Corporation: *See*—
Logan, Kathryn V., 4,888,166, Cl. 423-297.000.
Geortzel, Gerald: *See*—
Mitchell, Joan L.; Anderson, Karen L.; and Geortzel, Gerald, 4,888,645, Cl. 358-261.100.
Gergely, Gerhard; Gergely, Thomas; and Gergely, Irmgard. Pharamaceutical preparations in the form of instant granules or tablets and process for their manufacture. 4,888,177, Cl. 424-466.000.
Gergely, Irmgard: *See*—
Gergely, Gerhard; Gergely, Thomas; and Gergely, Irmgard, 4,888,177, Cl. 424-466.000.
Gergely, Thomas: *See*—
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Gerhard Rosorius: *See*—
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Gerken, Kenneth F.; and Sullivan, Robert A., to Integrated Power Corporation. Photovoltaic system controller. 4,888,702, Cl. 364-494.000.
Getson, Edward F., Jr.; Bradley, John W.; Gardner, Joseph P.; and Votolato, Alfred F., to Bull HN Information Systems Inc. Peripheral controller with paged data buffer management. 4,888,727, Cl. 364-900.000.
Gewerkschaft Eisenhutte Westfalia GmbH: *See*—
Cwielong, Heinrich; Mertens, Wilfried; and Merten, Gerhard, 4,887,991, Cl. 474-92.000.
Gholston, Yvonne: *See*—
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.
Giampapa, Vincent C. Method of positioning and securing a chin implant. 4,888,018, Cl. 623-16.000.
Giant Bay Biotech Inc.: *See*—
Hackl, Ralph P.; Wright, Frank R.; and Bruynesteyn, Albert, 4,888,293, Cl. 435-245.000.
Gibbons, Charles E.; Marano, Gerald A.; Kittrell, James M.; Whillock, Allan A.; Lanham, Robert L.; and Evans, Donald, to International Paper Company. Oxygen impermeable leak free container. 4,888,222, Cl. 428-34.200.
Gibilisco, Kenneth J., to Merck & Co., Inc. Adjustable tablet breaking apparatus. 4,887,755, Cl. 225-103.000.
Gibson, Mark: *See*—
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Gilbert, Robert C.: *See*—
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Giles, David: *See*—
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Gill & Duffus Products, Inc.: *See*—
Austin, Thomas F.; Donadio, Frank L., Jr.; Rudolph, David F.; and Shaw, Robert W., Jr., 4,887,475, Cl. 73-866.000.

Gillberg, Lars I.: *See*—
Mathiesen, Mait M.; Gillberg, Lars I.; Hellsten, Karl M. E.; and Karlsson, Gunvor B. T., 4,887,383, Cl. 44-51.000.

Ginn, Jerry W.: *See*—
Buttram, Malcolm T.; and Ginn, Jerry W., 4,888,556, Cl. 328-233.000.

Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, to Zambon, S.p.A. Process for the preparation of optically active alpha-arylalkanoic acids and novel intermediates thereof. 4,888,433, Cl. 549-450.000.

Gioscia, Thomas J. Knock down partition wall assembly. 4,887,401, Cl. 52-221.000.

Girardin, Roger: *See*—
Diot, Jean-Claude; and Girardin, Roger, 4,888,462, Cl. 219-69.200.

Given, Peter S., Jr.; and Arciszewski, Henry, to Nabisco Brands, Inc. Fruit-containing confectionery bar. 4,888,187, Cl. 426-102.000.

Given, Peter S., Jr.: *See*—
Huhn, Stephen D.; Given, Peter S., Jr.; and Klemann, Lawrence P., 4,888,195, Cl. 426-601.000.

Gjertsen, Robert K.; Knott, Ronald P.; and Sparrow, James A., to Westinghouse Electric Corp. Reconstitutable control assembly having removable control rods with detachable split upper end plugs. 4,888,151, Cl. 376-327.000.

GKN Technology Limited: *See*—
Cowburn, David; Rawlings, Stephen P.; and Pollard, Andrew, 4,887,841, Cl. 280-719.000.
Wilcox, Lester T., 4,887,802, Cl. 267-148.000.

Gladish, Herbert E.; Hallett, Ronald C.; and Blair, Richard C., to Eddy Forest Products, Ltd. Accumulation and storage system for palletized loads. 4,887,706, Cl. 198-774.000.

Gladstone, Ernest. Arrangement for and method of supplying hydrogen gas. 4,887,556, Cl. 123-1.00A.

Glaeser, Linda C.; Brazdil, James F., Jr.; and Toft, Mark A., to Standard Oil Company, The. Method for ammoxidation of paraffins and catalyst system therefor. 4,888,438, Cl. 558-319.000.

Glaser, Heinz: *See*—
Dotzer, Peter; Glaser, Heinz; Hahn, Reinhold; and Mayr, Ernst, 4,887,423, Cl. 57-295.000.

Gleim, Gunter, to Deutsche Thomson-Brandt GmbH. Arrangement for reproducing data readable by an optical scanner from tracks of a recorded medium. 4,888,754, Cl. 369-44.000.

Glesmann, Herbert C. Odometer disabling system and clutch therefor. 4,887,704, Cl. 192-90.000.

Glogowschek, Roland: *See*—
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Gluzerman, Boris; Lakatos, Nicholas; and Hensler, Paul W., to Edward Weck Incorporated. Beam deflector. 4,887,894, Cl. 350-636.000.

Gneiss, Heinz, to Robert Bosch GmbH. Air flow rate meter. 4,887,462, Cl. 73-118.200.

Gnekow, Barry R., to Ariel Vineyards, Inc. Simultaneous double reverse osmosis process for production of low and non-alcoholic beverages. 4,888,189, Cl. 426-231.000.

Godfroid, Jean-Jacques; Heymans, Francoise; and Braquet, Pierre, to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.). 5-oxy derivatives of tetrahydrofuran. 4,888,337, Cl. 514-326.000.

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Goedecke, Heidemarie: *See*—
Reichert, Hansjoerg; Scharf, Ludwig; Goedecke, Heidemarie; and Weidlcih, Herbert, 4,888,301, Cl. 437-72.000.

Goedken, James; and Schmidt, Clayton, to Hon Industries, Inc. File system with hang rail. 4,887,873, Cl. 312-184.000.

Goerge, Ashok K.: *See*—
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Goerlich, Dieter, to Webasto AG Fahrzeugtechnik. Process and device for operating an exhaust gas burner. 4,887,426, Cl. 60-274.000.

Goetsch, Duane A.; Say, Geoffrey R.; Vargas, Jose M.; and Eberly, Paul E., to Exxon Research and Engineering Company. Synthesis gas preparation and catalyst therefor. 4,888,131, Cl. 252-373.000.

Gold, Samuel: *See*—
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Goldberg, Ira B.: *See*—
McGinn, Vincent P.; and Goldberg, Ira B., 4,888,547, Cl. 324-58.50A.

Goldco Industries, Inc.: *See*—
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Golden, Gerald S.: *See*—
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Goldstar Co., Ltd.: *See*—
Sohn, Sang H., 4,888,077, Cl. 156-285.000.

Gongwer, Calvin A. Watercraft propulsion system. 4,887,540, Cl. 114-57.000.

Goodrich, Winston D.; Wesselski, Clarence J.; Pelischek, Timothy E.; Becker, Bruce H.; Kahn, Jon B.; Grimaldi, Margaret E.; McMansmen, John P.; and Castro, Edgar O., to United States of America, National Aeronautics and Space Administration. Orbiter escape pole. 4,887,780, Cl. 244-137.200.

Goodsell, Robert C.: *See*—
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Goodyear Tire & Rubber Company, The: *See*—
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Goto, Katsuhiko: *See*—
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Gotoh, Makoto; and Hamaoka, Kouji. Brushless DC motor. 4,888,533, Cl. 318-524.000.

Gough, Brian: *See*—
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Gougouyan, Yves: *See*—
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Grace Create Inc.: *See*—
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Graco Inc.: *See*—
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Mousseaux, Daniel; Chevet, Bruno; and Grard, Emmanuel, 4,887,882, Cl. 350-96.200.

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Green, Howard: *See*—
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Goodrich, Winston D.; Wesselski, Clarence J.; Pelischek, Timothy E.; Becker, Bruce H.; Kahn, Jon B.; Grimaldi, Margaret E.; McManamen, John P.; and Castro, Edgar O., 4,887,780, Cl. 244-137.200.

Grimm, Michael A.; and Hildebrant, Paul, to Teledyne Industries, Inc. Three reservoir capacitor. 4,888,677, Cl. 363-60.000.

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Marstiller, John A.; Bodensiek, Paul H.; and Grise, Frederick G., 4,888,089, Cl. 156-644.000.

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Penn, Paul E.; and Grissom, Gary R., 4,888,813, Cl. 388-838.000.

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Groswith, Charles T., III; and Seipp, Edwin A., III, to Taurus Holdings, Inc. Prong and tang binding system. 4,887,925, Cl. 402-15.000.

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Mohrbacher, Richard J.; and Grous, Philip P., 4,888,335, Cl. 514-217.000.

Groves, Oliver J., to Boeing Company, The. Test fitting. 4,887,646, Cl. 138-90.000.

Grunwald, Henry C., to ITT Corporation. Gas circulation apparatus for ceramic electron tubes. 4,888,518, Cl. 313-40.000.

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Grutzmacher, Bertold; and Blaser, Theodor, to Heidelberger Druckmaschinen AG. Device for conveying and aligning sheets in sheet-processing machines. 4,887,810, Cl. 271-225.000.

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Byszewski, Wojciech W.; Butler, Scott J.; Regan, Robert J.; and Proud, Joseph M., 4,888,528, Cl. 315-344.000.

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Keeffe, William M.; Karlotski, Robert J.; Kulik, Joseph S.; and Bazin, Simone P., 4,888,517, Cl. 313-25.000.
Siegrist, Stanley R., 4,887,980, Cl. 439-842.000.
Yale, Ramon L., 4,888,129, Cl. 252-301.60S.

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Chenoweth, Vaughn C.; and Goodsell, Robert C., 4,888,235, Cl. 428-283.000.

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Kyrtsos, Christos T.; Lutgen, F. Paul; and Gudat, Adam J., 4,887,454, Cl. 73-11.000.

Gueret, Jean-Louis, to L'Oreal. Brush for the application of mascara to the eyelashes. 4,887,622, Cl. 132-320.000.

Gueret, Jean-Louis, to L'Oreal. Container comprising a neck and a cap which can be manipulated with only one hand. 4,887,745, Cl. 222-499.000.

Guinea, Jesus: *See—*
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Gulya, Thomas G.; Schultz, Gary V.; and Arnold, Ronald A., to Appleton Mills. Method for extracting water from a paper web in a papermaking machine using a ceramic foam member. 4,888,095, Cl. 162-202.000.

Gunter, Jonas L.: *See—*
Rush, James B.; Bryan, James S.; Gunter, Jonas L.; Dillard, Guy W.; Meadows, Roger D.; and Henry, Pearison W., 4,887,851, Cl. 285-158.000.

Gupta, Subhash; Siduh, Sanjiv S.; and Vlach, Frank, to Texas Instruments Incorporated. Real-time scheduling system. 4,888,692, Cl. 364-402.000.

Guscott, John K., to Aritech Corporation. Pressure sensitive security system for tracking motion over a surface. 4,888,581, Cl. 340-666.000.

Guse, Kuno: *See—*
Koppers, Manfred; Sebastian, Lotar; and Guse, Kuno, 4,887,935, Cl. 405-302.000.

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Hanna, George, 4,887,816, Cl. 273-144.00A.

Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H.; and Linde, Rolf E., to U.S. Philips Corporation. Method of generating an image of a layer of an object. 4,888,794, Cl. 378-41.000.

Hackl, Ralph P.; Wright, Frank R.; and Bruynesteyn, Albert, to Giant Bay Biotech Inc. Adapting bacteria to low pH and high arsenic concentration for use in oxidizing sulfide ores. 4,888,293, Cl. 435-245.000.

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Nishimura, Yuusaku; Ishida, Masahiko; and Haga, Ryoichi, 4,888,285, Cl. 435-176.000.

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Haga, Toru: *See—*
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,888,045, Cl. 71-90.000.

Hagar, Donald K. Method and system for controlling the supply of fuel and air to a furnace. 4,887,958, Cl. 431-12.000.

Hagerty, Robert O.: *See—*
Allen, Luanne M.; Hagerty, Robert O.; and Mohring, Richard O., 4,888,318, Cl. 502-105.000.

Hahn, Granville J.; and Flud, Sammy K., to Permian Research Corporation. Rotary extruder with internally cooled rotor. 4,887,907, Cl. 366-99.000.

Hahn, Reinhold: *See—*
Dotzer, Peter; Glaser, Heinz; Hahn, Reinhold; and Mayr, Ernst, 4,887,423, Cl. 57-295.000.

Haislet, Gary A., to Goodyear Tire & Rubber Company, The. Apparatus and process of manufacturing a metal cord. 4,887,421, Cl. 57-58.540.

Hakemi, Hassan A.: *See—*
Pedretti, Ugo; Bonfanti, Cesarina; Montani, Enrico; Hakemi, Hassan A.; and Roggero, Arnaldo, 4,888,409, Cl. 528-129.000.

Hale, C. David, to Electric Eel Manufacturing Co., Inc. Cable coupler. 4,887,929, Cl. 403-328.000.

Hall, David B., to Litton Systems, Inc. Polarization maintaining fiber interferometer and method for source stabilization. 4,887,900, Cl. 356-350.000.

Hall, James W.: *See—*
Cerny, John R., Jr.; Olson, Jay H.; Hall, James W.; and Erdman, Leon P., 4,887,420, Cl. 56-320.200.

Hall, Steven D.: *See—*
Terry, Brian K.; Hall, Steven D.; and McDermott, Robert J., 4,888,544, Cl. 320-37.000.

Haller, Ivan, to International Business Machines Corporation. Easily manufacturable thin film transistor structures. 4,888,632, Cl. 357-23.700.

Hallett, Ronald C.: *See—*
Gladish, Herbert E.; Hallett, Ronald C.; and Blair, Richard C., 4,887,706, Cl. 198-774.000.

Hallett, Thomas D.; and Bierdeman, Donald H., to SkiDeer, Inc. Drag reducing apparatus. 4,887,823, Cl. 280-19.000.

Hallez, Charles P., to Diamant Boart Societe Anonyme. Device for closing a core barrel installed in a drilling rig. 4,887,676, Cl. 175-250.000.

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Dill, Walter R.; and Walker, Michael L., 4,888,121, Cl. 252-8.553.
Lord, David L.; McDaniel, Buddy W.; Harris, Lawrence E.; and Manrique, J. E., 4,887,670, Cl. 166-281.000.

Halliburton, Harold H.; and Moseley, Mark S., to Rowe Furniture Corporation. Fabric projection system. 4,887,898, Cl. 353-28.000.

Halm, Roland L.: *See—*
Chadwick, Kirk M.; Halm, Roland L.; and Keyes, Brian R., 4,888,435, Cl. 556-469.000.

Halpern, Donald F.; and Robin, Mark L., to BOC, Inc. Process for preparing CHF20CHFCF3 and CHF20CHC1CF3 and novel intermediate compounds employed therein. 4,888,139, Cl. 562-840.000.

Haltof, Garry P., to Newell Manufacturing Company. Tilt lock jambliner and slidable block. 4,887,389, Cl. 49-181.000.

Hamada, Masataka; Ishida, Tokuji; and Akada, Yasuaki, to Minolta Camera Kabushiki Kaisha. Automatic focus adjusting apparatus. 4,888,609, Cl. 354-402.000.

Hamamatsu, Takeo: *See—*
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Hamamura, Fumio: *See—*
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Hamaoka, Kouji: *See—*
Gotoh, Makoto; and Hamaoka, Kouji, 4,888,533, Cl. 318-524.000.

Hamashima, Eiji: *See—*
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,887,769, Cl. 239-493.000.

Hamblin, Ronald F., to SKF (U.K) Limited. Preventing movement of an article along a shaft or bore. 4,887,919, Cl. 384-562.000.

Hammanaka, Koichi: *See—*
Kojima, Keisuke; Kyuma, Kazuo; Noda, Susumu; Kameya, Masaaki; Ohta, Jun; and Hammanaka, Koichi, 4,888,782, Cl. 372-44.000.

Hamp, Charles H., III; and Weindorf, Paul F. L., to Honeywell Inc. Synchronization circuit for a resonant flyback high voltage supply. 4,888,821, Cl. 363-21.000.

Hamprecht, Rainer, to Bayer Aktiengesellschaft. Process for preparing 2-amino-thiophenes and azo dyestuffs prepared therefrom. 4,888,432, Cl. 549-57.000.

Han, William T., to Bristol-Myers Company. Antiarthritic β-cycloalkyl-β-oxopropionitriles. 4,888,357, Cl. 514-519.000.

Hanabusa, Kazuyoshi: *See—*
Kobayashi, Osamu; Miyagi, Satoshi; and Hanabusa, Kazuyoshi, 4,888,571, Cl. 336-65.000.

Hancock, Arnold H., to Aquacorp Limited. Pipe connector. 4,887,852, Cl. 285-175.000.

Handa, Akio: *See—*
Enokimoto, Akito; Hosoya, Eiji; Kasa, Keiji; Handa, Akio; Ishiwatari, Makoto; and Mizumoto, Kousei, 4,887,844, Cl. 280-779.000.

Handler, Michael D., to Velcro Industries B.V. Shear trap hook and loop fastening system. 4,887,338, Cl. 24-306.000.

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Simmerman, Richard H.; and Wiederer, Gregg E., 4,887,727, Cl. 211-124.000.

Hanna, George, to H & Y Enterprises. Lottery apparatus. 4,887,816, Cl. 273-144.00A.

Hano, Sunao: *See*—
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,888,696, Cl. 364-424.050.

Hanser, Patrick E. L., to Creation de Mecanismes, d'Automatismes et d'Asservissements. Device for brushing sealing surfaces of enclosure access holes. 4,887,328, Cl. 15-246.500.

Hanson, James B. Water leak detector and method therefor. 4,888,455, Cl. 200-61.040.

Hanson, Mark L., to MinnFac, Inc. Exterior lighting system. 4,888,669, Cl. 362-145.000.

Hara, Kenichi: *See*—
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa, 4,887,662, Cl. 164-427.000.

Hara, Naoki: *See*—
Baba, Kenji; Yahagi, Hayao; Watanabe, Shoji; Hara, Naoki; Yoda, Mikio; Mori, Shunji; Iida, Takashi; Katori, Takashi; and Ishida, Masahiko, 4,888,703, Cl. 364-496.000.

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Harada, Toru: *See*—
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Harada, Toshiaki; and Yamamoto, Tadashi, to Canon Kabushiki Kaisha. Illuminating apparatus and recording apparatus making use of the same. 4,888,635, Cl. 358-75.000.

Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, to Hitachi, Ltd. Superconducting device. 4,888,629, Cl. 357-5.000.

Haraguchi, Hiroshi: *See*—
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Takahashi, Ken-ichiroh; Inaba, Ritsuo; Sugano, Nobukazu; Harao, Horiyuki; Matsuyama, Yukihiro; Tanoue, Hiromi; and Kishi, Toru, 4,888,514, Cl. 310-316.000.

Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; Wada, Shunichi; and Ohtagaki, Shigeki, to Mitsubishi Kenki Kabushiki Kaisha. Suspension control apparatus for a vehicle. 4,887,840, Cl. 280-707.000.

Hardee, Judy D., executrix: *See*—
Frohardt, Melvin W.; Hartz, Keith H.; and Hardee, Patrick C., deceased, 4,887,589, Cl. 126-418.000.

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Hardwick, Roy, to Imperial Chemical Industries PLC. Method of making explosively bunded multi-laminar composite metal plate. 4,887,761, Cl. 228-107.000.

Harlow, Joanne: *See*—
Phillips, James G., Sr.; Phillips, James G., Jr.; Harlow, Joanne; and Scott, Gordon K., 4,887,317, Cl. 2-243.00R.

Harms, Jeffrey, to Ermanco Incorporated. Interlocking torque tube-pulley assembly for live roller line shaft conveyors. 4,887,707, Cl. 198-781.000.

Harris Corporation: *See*—
Kumar, Prithvi R.; and Abare, Wayne, 4,888,675, Cl. 363-47.000.
Malinowski, Christopher W., 4,888,741, Cl. 365-230.050.

Harris, Frank R.; and Young, Robert D. Form for molding columns. 4,887,789, Cl. 249-16.000.

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Lord, David L.; McDaniel, Buddy W.; Harris, Lawrence E.; and Manrique, J. E., 4,887,670, Cl. 166-281.000.

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Payne, Peter A.; Bartlett, Jon G.; and Harris, Natalie K., 4,887,455, Cl. 73-27.00R.

Harris, Ralph; Toguri, James; and Wraith, Albert. Producing volatile metals. 4,888,052, Cl. 75-20.00R.

Harris, Robert S., to Stant Inc. Pressure-release fuel cap. 4,887,733, Cl. 220-203.000.

Harrison, Dan W. Bass boat pedestal seat-mounted tackle box. 4,887,379, Cl. 43-54.100.

Harstead, Edward E.: *See*—
Prucnal, Paul R.; Elby, Stuart DS.; and Harstead, Edward E., 4,887,879, Cl. 350-96.150.

Hart, Peter B.; Chilton, George A. A.; and Kirk, Richard A., to Plessey Company plc, The. Light emitting diode array. 4,888,603, Cl. 346-160.000.

Hart, Richard T., to Varo, Inc. Lens retainer for optical element. 4,887,887, Cl. 350-252.000.

Hartitz, J. Ernst, to B. F. Goodrich Company, The. Method of making extruded amorphous thermoplastic pipe having reduced internal stress. 4,888,148, Cl. 264-209.500.

Hartman, Marvis E., to PPG Industries, Inc. Method of treating a polyolefin substrate with adhesion promoters containing optical brightener. 4,888,205, Cl. 427-54.100.

Hartvigsen, Jay A.; and Moyer, William C., to Motorola, Inc. Dynamic disable mechanism for a memory management unit. 4,888,688, Cl. 364-200.000.

Hartz, Keith H.: *See*—
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Harvey, Robin J.: *See*—
Dolezal, Franklin A.; and Harvey, Robin J., 4,888,776, Cl. 372-2.000.

Harville, Dyle: *See*—
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.

Harwood, Craig E.; and Strathman, Lyle R., to Rockwell International Corp. Real time apparatus for adjusting contrast ratio of liquid crystal displays. 4,888,599, Cl. 340-812.000.

Hasan, Syed H.: *See*—
Elger, Walter; Beier, Sybille; Fahnrich, Marianne; Kosub, Beate; Chwalisz, Krzysztof; and Hasan, Syed H., 4,888,331, Cl. 514-170.000.

Hasegawa, Shinji: *See*—
Wada, Akihiro; Kakuta, Rin-ichi; Ohuchi, Kenji; Sugiyama, Jun; and Hasegawa, Shinji, 4,888,387, Cl. 525-66.000.

Hasegawa, You: *See*—
Isozaki, Yasuhito; Okano, Kazuyuki; and Hasegawa, You, 4,888,210, Cl. 427-126.300.

Hasenack, Hendricus J. A.; and Poll, Ian, to Shell Oil Company. Partial combustion burner with spiral-flow cooled face. 4,887,962, Cl. 110-263.000.

Hashimoto, Atsunori: *See*—
Fujiwara, Yasuhiko; Abe, Toshiro; Hashimoto, Atsunori; Nakazawa, Shinsuke; Nagano, Masami; and Atago, Takeshi, 4,887,573, Cl. 123-422.000.

Hashimoto, Hikotaka; and Kobayashi, Kunio, to Kikkoman Corporation. Method of manufacturing soy sauce. 4,888,190, Cl. 426-231.000.

Hashimoto, Kenzaburo, to Maruemu Seisakusho Co., Ltd. Dual composite headed self-threading screw. 4,887,951, Cl. 411-371.000.

Hashimoto, Masashi; and Nomura, Masayoshi, to Texas Instruments Incorporated. Semiconductor memory device using stored capacitor charge for writing data. 4,888,736, Cl. 365-189.010.

Hasler AG: *See*—
Berger, Erwin; and Moy, Christian, 4,887,807, Cl. 271-171.000.

Hata, Kosei, to Seikenkai. Deodorant and method for preparing and storing same. 4,888,292, Cl. 435-244.000.

Hata, Yasuaki; Yasukawa, Takeshi; and Onishi, Masayoshi, to Mitsubishi Denki Kabushiki Kaisha. Rotation detecting device having a terminal holding arrangement. 4,888,551, Cl. 324-208.000.

Hatfield, Walter B.; Tobol, Nathan; and Scholl, Frederick W., to Codenoll Technology Corporation. Method and apparatus for detecting the collision of data packets utilizing a preassigned transceiver code in the preamble. 4,888,763, Cl. 370-85.200.

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Kato, Chiaki; Nishi, Masaya; and Hatta, Toshiyuki, 4,887,340, Cl. 29-130.000.

Haug, Friedrich, to Siemens Aktiengesellschaft. Transmission-reception equipment for a bus system. 4,888,764, Cl. 370-85.100.

Hauge, Leif J. Pressure exchanger for liquids. 4,887,942, Cl. 417-64.000.

Hauke, Wilhelm, to Georg Fischer AG. Casting mold for foundry castings. 4,887,661, Cl. 164-55.100.

Hauser, Karl-Heinz; Heissel, Uwe; Inauen, Walter; Neff, Karl; and Ringger, Manfred, to NEFF Gewindespindeln GmbH. Linear drive system. 4,887,477, Cl. 74-89.170.

Hayakawa, Isse, to NGK Insulators, Ltd. Internal combustion engine piston with threaded ceramic piston head. 4,887,518, Cl. 92-212.000.

Hayakawa, Yasuyoshi: *See*—
Fujino, Hitoshi; Sawada, Takamasa; Kobayashi, Hiroo; Ohuchi, Osamu; Yagi, Tadashi; and Hayakawa, Yasuyoshi, 4,888,620, Cl. 355-211.000.

Hayashi, Katsunori: *See*—
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Hayashi, Kenji: *See*—
Oka, Tetsuo; Hayashi, Kenji; Akamatsu, Takayoshi; and Horiuchi, Satoshi, 4,888,211, Cl. 427-130.000.

Hayashi, Kenrou; Oguma, Reiji; and Tamura, Masayuki, to Toshiba Ceramics Co., Ltd. Process for producing β-form Si_3N_4. 4,888,142, Cl. 264-65.000.

Hayashi, Mikio; and Otsuka, Fumio, to Seikosha Co., Ltd. Dot printer having means for discharging static electricity from the ink ribbon. 4,887,921, Cl. 400-196.100.

Hayashi, Nobuo: *See*—
Yoshino, Thunekazu; Morita, Hiroshi; Nakano, Hirotaka; Hayashi, Nobuo; and Kubota, Yuko, 4,887,760, Cl. 228-56.300.

Hayashi, Shigenori: *See*—
Urata, Kazuo; Hirose, Naoki; and Hayashi, Shigenori, 4,887,548, Cl. 118-722.000.

Hayashida, Michiya: *See*—
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa, 4,887,662, Cl. 164-427.000.

Hayden, James T. Electrically lighted leash. 4,887,552, Cl. 119-109.000.

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Hazelzet, Bruce G.: *See*—
Arlington, David L.; Cole, Jacqueline M.; Hazelzet, Bruce G.; Krolak, David J.; Li, Hehching H.; Oza, Bharat J.; and Weaver, A. Frank, 4,888,773, Cl. 371-40.200.
Hebeisen, Paul, to Hoffmann-La Roche Inc. Process for producing allyl aminothiazole acetate intermediates. 4,888,429, Cl. 548-194.000.
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Forster, Gervase L., 4,887,915, Cl. 384-57.000.
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shi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.
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Hofius, Walter E. Vehicle leveling and stabilizing apparatus. 4,887,359, Cl. 33-366.000.
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Holland, Bruce K. Nose plug. 4,887,597, Cl. 128-206.110.
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Enokimoto, Akito; Hosoya, Eiji; Kasa, Keiji; Handa, Akio; Ishiwatari, Makoto; and Mizumoto, Kousei, 4,887,844, Cl. 280-779.000.
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Moore, Eugene A.; and Lutz, Elmer B., 4,887,703, Cl. 192-45.000.

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Ishiwaka, Takumi; Andoh, Yukio; Yamaguchi, Michiyuki; Suzuki, Shosuke; Egashira, Yoshinori; Yokobori, Takeo; and Ohashi, Takashi, to Bridgestone Corporation. Platen roll. 4,887,923, Cl. 400-659.000.
Ishiwata, Masao: *See*—
Nakada, Toshio; Takemura, Fumio; and Ishiwata, Masao, 4,888,215, Cl. 427-215.000.
Ishiwatari, Makoto: *See*—
Enokimoto, Akito; Hosoya, Eiji; Kasa, Keiji; Handa, Akio; Ishiwatari, Makoto; and Mizumoto, Kousei, 4,887,844, Cl. 280-775.000.
Ishizuka, Ichiro: *See*—
Sumimoto, Shinzaburo; Ishizuka, Ichiro; Ueda, Shiro; Kai, Hiroyuki; and Ide, Kinya, 4,888,044, Cl. 71-88.000.
Ishizuka, Yuzo: *See*—
Sakayori, Kiyoshi; Iwasaki, Shinichi; Ishida, Yozo; Shinogaya, Toshikazu; and Ishizuka, Yuzo, 4,887,950, Cl. 411-302.000.
Isnardi, Michael A.; Smith, Terrence R.; Fuhrer, Jack S.; and Roeder, Barbara J., to General Electric Company. Extended definition widescreen television system using plural signal transmission channels. 4,888,641, Cl. 358-141.000.
Isobe, Yutaka: *See*—
Sunagawa, Makoto; Isobe, Yutaka; Takeuchi, Yutaka; Matsumura, Haruki; Ozaki, Yukio; and Noguchi, Tetsuo, 4,888,344, Cl. 514-210.000.
Isozaki, Yasuhito; Okano, Kazuyuki; and Hasegawa, You, to Matsushita Electric Industrial Co., Ltd. Method for making transparent conductive film. 4,888,210, Cl. 427-126.300.
Israel, Gary; Nadzan III, Andrew; and Deierlein, William, to Avon Products, Inc. Method for means for making segmented cosmetic articles. 4,887,409, Cl. 53-436.000.
Issard, Gerard; and Boissonnet, Michel, to Wichard. Device for a screw connection between two pieces. 4,887,928, Cl. 403-287.000.
Istituto Biochimico Sperimentale Ibis S.P.A.: *See*—
Contos, Simos, 4,888,359, Cl. 514-569.000.
Itani, Hikotaro: *See*—
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa, 4,887,662, Cl. 164-427.000.
Itch, Kenji: *See*—
Tsujimoto, Shinichi; Amano, Kenichiro; and Itch, Kenji, 4,888,610, Cl. 354-475.000.
Ito, Hiroaki: *See*—
Igarashi, Ichiro; Ito, Hiroaki; and Nishimura, Kazuhiko, 4,887,647, Cl. 138-126.000.
Ito, Masahiro: *See*—
Sakimori, Hideharu; Komatsu, Yoji; Ito, Masahiro; and Ohkuma, Nobuyoshi, 4,887,341, Cl. 29-156.40R.
Itoh, Isamu; Ono, Mitsunori; and Inagaki, Yoshio, to Fuji Photo Film Co., Ltd. Silver halide photographic materials comprising blocked photographic reagants releasing plug groups. 4,888,268, Cl. 430-218.000.
Itoh, Kohji: *See*—
Teranishi, Akio; Genji, Nobuo; and Itoh, Kohji, 4,888,788, Cl. 375-1.000.
Itoh, Masataka, to NEC Corporation. Optical head for recording informations into a record medium and reproducing the same therefrom. 4,888,755, Cl. 369-45.000.
Itoh, Seiki: *See*—
Matsuda, Minoru; Itoh, Seiki; and Ono, Hiroshi, 4,888,392, Cl. 526-279.000.
Itoh, Yasuo: *See*—
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa, 4,887,662, Cl. 164-427.000.
Itoi, Masaaki: *See*—
Ohta, Masakatsu; and Itoi, Masaaki, 4,887,957, Cl. 425-72.200.
ITT Corporation: *See*—
Flowers, Charles V.; and Sass, Bernard J., 4,887,853, Cl. 285-287.000.
Friend, Alden E.; and Dunham, Lawrence A., 4,887,631, Cl. 137-74.000.
Grunwald, Henry C., 4,888,518, Cl. 313-40.000.
Ivers, Douglas E.; Miller, Lane R.; and Schroeder, Warren R., to Lord Corporation. Vibration attenuating method utilizing continuously variable semiactive damper. 4,887,699, Cl. 188-378.000.
Iwai, Masakazu: *See*—
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.
Iwakura, Ken: *See*—
Kawakami, Hiroshi; Igarashi, Akira; and Iwakura, Ken, 4,888,321, Cl. 503-208.000.
Iwasaki, Shinichi: *See*—
Sakayori, Kiyoshi; Iwasaki, Shinichi; Ishida, Yozo; Shinogaya, Toshikazu; and Ishizuka, Yuzo, 4,887,950, Cl. 411-302.000.
Iwasaki, Tetsuji; and Hosokawa, Hitoshi, to Kao Corporation. Synergist for biocide. 4,888,049, Cl. 71-94.000.
Iwata, Kazuo: *See*—
Shikama, Shinsuke; Toide, Eiichi; Kondou, Mitsushige; and Iwata, Kazuo, 4,888,760, Cl. 369-122.000.
Iwayama, Kenzo: *See*—
Yoshitomi, Yasunari; Iwayama, Kenzo; Nagashima, Takeo; and Yakashiro, Kenichi, 4,888,066, Cl. 148-113.000.
Izawa, Akihiro: *See*—
Igashira, Toshihiko; Sakakibara, Yasuyuki; Abe, Seiko; Sekiguchi, Kiyonori; Izawa, Akihiro; and Kawai, Hisasi, 4,887,569, Cl. 123-300.000.

J.M. Huber Corporation: *See*—
Kosin, John A.; and Andrews, Claude R., 4,888,160, Cl. 423-430.000.
Kostinko, John A., 4,888,378, Cl. 524-450.000.

J. W. Hicks, Inc.: *See*—
Hicks, James W., 4,887,748, Cl. 222-606.000.

Jackson, Lucinda A.; and Malhotra, Sudarshan K., to Dow Chemical Company, The. Grain selective herbicides. 4,588,041, Cl. 71-88.000.

Jacobs, Leon D., to North American Philips Corporation. Water-proof outdoor tap with improved waterproof connector. 4,887,979, Cl. 439-578.000.

Jacobs, Michael L.: *See*—
Spahn, James G.; Langley, Steven P.; and Jacobs, Michael L., 4,887,715, Cl. 206-370.000.

Jagenberg Aktiengesellschaft: *See*—
Sommer, Herbert; and Ruckert, Hans, 4,887,547, Cl. 118-410.000.

Jager, Willem W.: *See*—
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,888,361, Cl. 518-700.000.

James, Barry D.; and James, Herbert W., to James Naylor Limited. Connecting means for frangible and/or friable articles. 4,887,385, Cl. 47-41.120.

James, Donald R.: *See*—
Milano, Pamela D.; and James, Donald R., 4,888,047, Cl. 71-92.000.

James, Herbert W.: *See*—
James, Barry D.; and James, Herbert W., 4,887,385, Cl. 47-41.120.

James, John R.: *See*—
Sheehan, Larry A.; and James, John R., 4,887,378, Cl. 43-42.250.

James Naylor Limited: *See*—
James, Barry D.; and James, Herbert W., 4,887,385, Cl. 47-41.120.

James River Corporation: *See*—
Katz, Leon; and Hollenberg, David H., 4,888,238, Cl. 428-378.000.

Jan, Ying-Wen: *See*—
Lin, Yuh-Wen; and Jan, Ying-Wen, 4,887,914, Cl. 394-12.000.

Jane S.A.: *See*—
Cabagnero, Ramon J., 4,887,834, Cl. 280-642.000.

Janse, Cornelis P.: *See*—
Driessen, Leonardus M. H. E.; Janse, Cornelis P.; and Lahaije, Paul D. M. E., 4,888,698, Cl. 364-443.000.

Jansen, Adolf E., to Douwes Vastgoed B.V. Sampler. 4,887,472, Cl. 73-863.860.

Jansen, George A.; and Hinnen, Hans R., to Band-It-Idex, Inc. Clamping assembly with side entry connection of a clamp unit to a band. 4,887,334, Cl. 24-23.00R.

Janski, Alvin M.; and Drengler, Susan M., to International Minerals & Chemical Corp. Method for stabilizing somatotropins. 4,888,416, Cl. 530-399.000.

Janssen Pharmaceutica N.V.: *See*—
Janssens, Frans E.; Torremans, Joseph L. C.; and Hens, Jozef F., 4,888,426, Cl. 546-118.000.

Janssens, Frans E.; Torremans, Joseph L. G.; and Hens, Jozef F., to Janssen Pharmaceutica N.V. 1-(5-methyl-furan-2-ylmethyl)-N-(4-piperidinyl)imidazo [4,5-6]pyridine-2-amine. 4,888,426, Cl. 546-118.000.

Japan Aviation Electronics Industry, Limited: *See*—
Ichimura, Yoshiaki; Takegawa, Katumi; Mizusawa, Yoshinori; Komoto, Mitsuo; and Umesato, Shoji, 4,887,974, Cl. 439-259.000.
Sakuma, Kazuhiro; Fukumoto, Yasuhiko; and Tomioka, Akihiro, 4,887,467, Cl. 73-517.00B.

Jarred, Ronald L. Fused electrical receptacle. 4,887,975, Cl. 439-490.000.

Jarrett, Adrian E., to Plessey Overseas Limited. Variable bandwidth filter. 4,888,502, Cl. 307-520.000.

Jarvis, Ronald P.: *See*—
Welander, Bo C.; Onlin, Tommy C. K.; and Jarvis, Ronald P., 4,888,099, Cl. 204-95.000.

Jehanno, Nicole: *See*—
Junino, Alex; Lang, Gerard; and Jehanno, Nicole, 4,888,445, Cl. 564-441.000.

Jelinek, Jan, to ELITEX koncern textilniho strojirenstvi. Thread cutting device. 4,887,440, Cl. 66-145.00S.

Jenkin, Keith R.; and Chan, Shufan, to Animated Voice Corporation. Computer speech system. 4,888,806, Cl. 381-35.000.

Jennings, Kenneth L.: *See*—
Jennings, Paul D.; and Jennings, Kenneth L., 4,887,738, Cl. 221-264.000.

Jennings, Paul D.; and Jennings, Kenneth L. Article dispenser. 4,887,738, Cl. 221-264.000.

Jennings, Richard E.: *See*—
Crane, Jack W.; Anstee, L. Lavern; VanGinhoven, Robert M.; and Jennings, Richard E., 4,887,416, Cl. 56-13.600.

Jensen, James W.: *See*—
Ditto, James W.; and Jensen, James W., 4,888,717, Cl. 364-559.000.

Jensen, John E.: *See*—
Tutt, Lee W.; and Jensen, John E., 4,888,204, Cl. 427-53.100.

Jernigan, Daniel A.: *See*—
Gaddis, Joseph L.; and Jernigan, Daniel A., 4,888,114, Cl. 210-500.250.

Jeromson, Jeffrey T.; and Williams, Peter C., to Whitey Co. Tee fitting integrally formed in valve body. 4,887,644, Cl. 137-876.000.

Joffe, Edward J. Knockdown drawers and bins. 4,887,874, Cl. 312-258.000.

Johann Wolf GmbH Kg: *See*—
Wolf, Johann, 4,887,952, Cl. 411-466.000.

Johnson, Barry C.: *See*—
Crane, Jacob; Johnson, Barry C.; Mahulikar, Deepak; and Butt, Sheldon H., 4,888,449, Cl. 174-52.400.

Johnson, Charles D.: *See*—
Mayfield, Alfred B., 4,887,487, Cl. 74-687.000.

Johnson, Dwight N., to Masco Corporation of Indiana. Fluid fill valve with accurate fill level mechanism. 4,887,635, Cl. 137-393.000.

Johnson, Gerald W.; and Johnson, Jeffrey W. Vacuum apparatus. 4,888,003, Cl. 604-319.000.

Johnson, James H.: *See*—
Greene, James E.; and Johnson, James H., 4,887,821, Cl. 273-411.000.

Johnson, Jeffrey W.: *See*—
Johnson, Gerald W.; and Johnson, Jeffrey W., 4,888,003, Cl. 604-319.000.

Johnson, Tiffin E., to Houdry Process Corporation. Fluid catalytic cracking unit regeneration having internal cooling means. 4,888,156, Cl. 422-144.000.

Johnston, Jon: *See*—
Smith, Gerald J.; Trask, Elwood G.; Ellis, Paul; Johnston, Jon; Campbell, Brian; and Rorie, Leon, 4,888,234, Cl. 428-234.000.

Johnston, Wilbur D., Jr.; Karlicek, Robert F., Jr.; Long, Judith A.; and Wilt, Daniel P., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Semiconductor devices employing high resistivity in-based compound group III-IV epitaxial layer for current confinement. 4,888,624, Cl. 357-16.000.

Joint Medical Products Corporation: *See*—
Forte, Mark R.; and Noiles, Douglas G., 4,888,021, Cl. 623-20.000.

Jonas, Friedrich; and Waldenrath, Werner, to Bayer Aktiengesellschaft. Process for antistatic treatment of plastic mouldings. 4,888,243, Cl. 428-411.100.

Jones, Gareth M., to Dow Corning Limited. Silicone foam masses. 4,888,217, Cl. 427-236.000.

Jones, Howard; Lukacsko, Alison B.; Tencza, Thomas M.; Sarsfield, Beth A.; and Patel, Mahesh K., to Bristol-Myers Company. Pharmaceutical compositions for relief of dysmenorrhea and/or premenstrual syndrome and process. 4,888,343, Cl. 514-264.000.

Jones, Ronald L.: *See*—
Moch, John E.; and Jones, Ronald L., 4,887,861, Cl. 296-70.000.

Joos, Eugen: *See*—
Hemminger, Hermann; Joos, Eugen; Jundt, Werner; and Werner, Peter, 4,888,697, Cl. 364-431.110.

Joppien, Hartmut: *See*—
Neh, Harribert; Buhmann, Ulrich; Wegner, Peter; Joppien, Hartmut; Giles, David; and Rowson, Graham P., 4,888,340, Cl. 514-403.000.

Jorgensen, Stephen W.: *See*—
Dimmick, John H., III; and Jorgensen, Stephen W., 4,887,949, Cl. 411-121.000.

Jorkasky, Richard J., II: *See*—
Quigley, Vincent P.; and Jorkasky, Richard J., II, 4,888,367, Cl. 524-17.000.

Josson, Bert O., to Besam AB. Object sensing apparatus. 4,888,532, Cl. 318-480.000.

Joswig, Thomas: *See*—
Freitag, Dieter; Joswig, Thomas; Idel, Karsten; Fullmann, Heinz-Josef; and Muller, Friedemann, 4,888,370, Cl. 524-100.000.

Julius, Edmund, to AMEPA Angewandte Messtechnik und Prozessautomatisierung GmbH. Device for detecting slag flowing with molten metal through an outlet opening in a metallurgical vessel. 4,887,798, Cl. 266-99.000.

Jundt, Werner: *See*—
Hemminger, Hermann; Joos, Eugen; Jundt, Werner; and Werner, Peter, 4,888,697, Cl. 364-431.110.

Junino, Alex; Lang, Gerard; and Jehanno, Nicole, to L'Oreal. New 2,4-diritro- or 2-amino-4-nitro- or 2-nitro-4-amino-6-hydroxyalkylanilines, the process for preparation thereof and their use in dyeing keratinous fibres, and especially human hair. 4,888,445, Cl. 564-441.000.

Junkman, Florence F.: *See*—
Junkman, John W.; and Junkman, Florence F., 4,887,729, Cl. 215-100.00A.

Junkman, John W.; and Junkman, Florence F. Cup for handicapped persons. 4,887,729, Cl. 215-100.00A.

Just, Melitta: *See*—
Bohn, Helmut; Just, Melitta; and Nitz, Rolf-Eberhard, 4,888,333, Cl. 514-212.000.

Kabushiki Kaisha Kuwabara Seisakusho: *See*—
Kuwabara, Kenichi; and Miyata, Makoto, 4,887,961, Cl. 431-177.000.

Kabushiki Kaisha Kyoritsu: *See*—
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,887,522, Cl. 98-40.200.

Kabushiki Kaisha Sankyo Seiki Seisakusho and Toto, Ltd.: *See*—
Saito, Kazuharu; Hiraguri, Masao; Yamada, Sadao; and Shiozawa, Junichi, 4,887,345, Cl. 29-568.000.

Kabushiki Kaisha Shinkawa: *See*—
Suzuki, Yasunobu; Kato, Motohiko; Bando, Akio; Ishida, Hisao; and Nishimura, Akihiro, 4,887,758, Cl. 228-5.100.

Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See*—
Sato, Koki, 4,887,842, Cl. 280-730.000.
Suzuki, Masaru, 4,888,456, Cl. 200-61.270.

Kabushiki Kaisha Toshiba: *See*—
Abuyama, Yasuo, 4,888,650, Cl. 358-451.000.
Nakagawa, Kaoru; Yamamoto, Yoshio; and Matsuoka, Nobutaka, 4,888,304, Cl. 437-86.000.

Nitta, Tsuneo; Uehara, Kensuke; and Watanabe, Sadakazu, 4,888,823, Cl. 381-43.000.
Ogura, Yoichi, 4,888,560, Cl. 330-254.000.
Okamoto, Shingo, 4,888,520, Cl. 313-292.000.
Shirakawa, Masakazu; Yamashita, Hiroaki; and Nishida, Toshio, 4,888,728, Cl. 364-900.000.
Yoshimaru, Tomohisa; and Kajitani, Seinosuke, 4,888,751, Cl. 369-36.000.
Yoshino, Thunekazu; Morita, Hiroshi; Nakano, Hirotaka; Hayashi, Nobuo; and Kubota, Yuko, 4,887,760, Cl. 228-56.300.

Kadakia, Shailesh R., to Texas Instruments Incorporated. Integrated-circuit power-up pulse generator circuit. 4,888,498, Cl. 307-296.400.

Kadash, Raymond J.: *See*—
Frisco, Frank D.; Kadash, Raymond J.; and Silverman, Keith B., 4,887,903, Cl. 356-372.000.

Kadoma, Yoshihito: *See*—
Kohashi, Hitoshi; Shizuka, Nobuhiko; and Kadoma, Yoshihito, 4,888,132, Cl. 252-393.000.

Kagiyama, Junji: *See*—
Kobayashi, Kiyonori; Kamiya, Masakazu; Kagiyama, Junji; and Hyodo, Motoi, 4,887,485, Cl. 74-574.000.

Kagota, Minoru, to Shinano Kikaku Company Ltd. Noncopiably recorded videotape and noncopiably videotape-recording system. 4,888,649, Cl. 358-335.000.

Kahn, John H.: *See*—
Murib, Jawad H.; and Kahn, John H., 4,888,443, Cl. 562-517.000.

Kahn, Jon B.: *See*—
Goodrich, Winston D.; Wesselski, Clarence J.; Pelischek, Timothy E.; Becker, Bruce H.; Kahn, Jon B.; Grimaldi, Margaret E.; McManamen, John P.; and Castro, Edgar O., 4,887,780, Cl. 244-137.200.

Kai, Hiroyuki: *See*—
Sumimoto, Shinzaburo; Ishizuka, Ichiro; Ueda, Shiro; Kai, Hiroyuki; and Ide, Kinya, 4,888,044, Cl. 71-88.000.

Kaiser, Johann F. Dredges. 4,887,371, Cl. 37-66.000.

Kajioka, Hiroyuki: *See*—
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa, 4,887,662, Cl. 164-427.000.

Kajita, Kozo: *See*—
Yoshimitsu, Kazumi, deceased; Sekido, Shintaro; Kazehara, Kenya; Kajita, Kozo; and Manabe, Toshikatsu, 4,858,255, Cl. 429-101.000.

Kajitani, Seinosuke: *See*—
Yoshimaru, Tomohisa; and Kajitani, Seinosuke, 4,888,751, Cl. 369-36.000.

Kajiwara, Akiharu: *See*—
Yamatsu, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Murakami, Manabu; Oketani, Kiyoshi; and Fujisaki, Hideaki, 4,888,439, Cl. 560-129.000.

Kakimi, Fujio; and Ishikawa, Shunichi, to Fuji Photo Film Co., Ltd. Light-sensitive microcapsule containing polymerizable compound and silver halide, and light-sensitive material employing the same wherein the silver halide is embedded in the shell wall comprised of polyurea or polyurethane. 4,888,265, Cl. 430-138.000.

Kakimoto, Syoichi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor light emitting device. 4,888,782, Cl. 372-46.000.

Kakuta, Rin-ichi: *See*—
Wada, Akihiro; Kakuta, Rin-ichi; Ohuchi, Kenji; Sugiyama, Jun; and Hasegawa, Shinji, 4,888,387, Cl. 525-66.000.

Kalessidis, Vassilios: *See*—
Tannenbaum, Eli; Burgess, Trevor; Kalessidis, Vassilios; Orban, Andre; Williams, John; and Zanker, Klaus, 4,887,464, Cl. 73-153.000.

Kalinowski, Robert E.: *See*—
Graiver, Daniel; and Kalinowski, Robert E., 4,888,364, Cl. 521-64.000.

Kallin, Fredrik L. N.; and Reid, Bruce A., to NCR Corporation. Aligning and protective cover for a motor. 4,888,481, Cl. 250-231.0SE.

Kamata, Yasuji: *See*—
Shimokawa, Ryushi; Ueda, Seiichi; Kamata, Yasuji; Yamashita, Kenkichi; Kato, Kazuo; and Sato, Hideo, 4,888,561, Cl. 330-290.000.

Kambayashi, Makoto; Nakatani, Kensuke; Ozaki, Kazuaki; Tomida, Masahito; Haraguchi, Hiroshi; and Hamamatsu, Takeo, to Sanyo Electric Co., Ltd. Method and apparatus for manufacturing electrode for battery. 4,887,349, Cl. 29-623.500.

Kameya, Masaaki: *See*—
Kojima, Keisuke; Kyuma, Kazuo; Noda, Susumu; Kameya, Masaaki; Ohta, Jun; and Hammanaka, Koichi, 4,888,783, Cl. 372-44.000.

Kamio, Kunimasa: *See*—
Yasuhisa, Saito; Kamio, Kunimasa; Shibata, Mitsuhiro; Watanabe, Katsuya; Shiomi, Yutaka; and Ueda, Youichi, 4,888,407, Cl. 525-423.000.

Kamis, Russell P.; Klosowski, Jerome M.; and Lower, Loren D., to Dow Corning Corporation. Clear, non-slumping silicone sealants. 4,888,380, Cl. 524-588.000.

Kamiya, Masakazu: *See*—
Kobayashi, Kiyonori; Kamiya, Masakazu; Kagiyama, Junji; and Hyodo, Motoi, 4,887,485, Cl. 74-574.000.

Kamiya, Norikazu; and Murai, Katsumi, to Aisan Kogyo Kabushiki Kaisha. Information signal transmitting device. 4,888,585, Cl. 340-825.340.

Kanaguchi, Masahiro; and Kawamoto, Hideo, to Sony Corporation. Reel table assembly. 4,887,775, Cl. 242-68.100.

Kanai, Masahiro: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,888,062, Cl. 136-258.000.

Kanai, Tamotsu; and Hayashi, Katsunori, to Akebono Brake Industry Co., Ltd. Method for forming a piston having a peg. 4,887,449, Cl. 72-356.000.

Kaneko, Toyoji: *See*—
Sukimoto, Minobu; Yamazaki, Katsumi; Hirunuma, Naohisa; Taguchi, Seijiro; Usui, Tadashi; Akiyoshi, Yasushi; Nogami, Toyoichiro; and Kaneko, Toyoji, 4,887,557, Cl. 123-52.0MC.

Kaneko, Youichi: *See*—
Tsunaga, Masayuki; Yuba, Kazuaki; and Kaneko, Youichi, 4,888,135, Cl. 252-512.000.

Kanesaki, Nobukazu: *See*—
Shinzawa, Motohiro; and Kanesaki, Nobukazu, 4,887,427, Cl. 60-286.000.

Kang, Insik. Electronic compass. 4,887,358, Cl. 33-363.00K.

Kanno, Ryoichi: *See*—
Ichikawa, Haruo; Kanno, Ryoichi; and Nakatsukasa, Masato, 4,887,529, Cl. 101-181.000.
Ichikawa, Haruo; Kanno, Ryoichi; and Kiyomiya, Masayuki, 4,887,531, Cl. 101-216.000.

Kanoe, Toshio: *See*—
Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, 4,888,127, Cl. 252-299.500.

Kansai Paint Co., Ltd.: *See*—
Masubuchi, Yoichi; Watanabe, Tadashi; Tominaga, Akira; Nagaoka, Haruo; Nakatani, Eisaku; and Kume, Masafumi, 4,888,244, Cl. 428-416.000.

Kantner, Richard D. Lightweight foldable wheelchair. 4,887,826, Cl. 280-250.100.

Kao Corporation: *See*—
Iwasaki, Tetsuji; and Hosokawa, Hitoshi, 4,888,049, Cl. 71-94.000.

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Wilkinson, William R.; Webber, Marion G.; and King, Dean J., 4,887,790, Cl. 249-52.000.

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DeVore, Richard A.; and Kinney, Sam E., 4,888,017, Cl. 623-10.000.

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Kubodera, Akiko; Tanaka, Touichi; and Komori, Yukimichi, 4,888,163, Cl. 424-1.100.

Komoto, Mitsuo: *See—*
Ichimura, Yoshiaki; Takegawa, Katumi; Mizusawa, Yoshinori; Komoto, Mitsuo; and Umesato, Shoji, 4,887,974, Cl. 439-259.000.

Kondo, Teruhisa: *See—*
Matsuo, Koichiro; Maekawa, Kazuhiro; and Kondo, Teruhisa, 4,888,242, Cl. 428-408.000.

Kondoh, Eiki; Morinaga, Shigeki; Yaginuma, Takao; and Asai, Takeshi, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Elementary function arithmetic unit. 4,888,721, Cl. 364-736.000.

Kondou, Mitsushige: *See—*
Shikama, Shinsuke; Toide, Eiichi; Kondou, Mitsushige; and Iwata, Kazuo, 4,888,760, Cl. 369-122.000.

Kondou, Tsutomu, to Mitsubishi Kasei Corporation; and Nikken Chemicals Company, Limited. Fermented milk. 4,888,183, Cl. 426-34.000.

Konica Corporation: *See—*
Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,888,262, Cl. 430-58.000.

Konig, Joachim: *See—*
Koll, Jochen; Muller, Friedhelm; Bieber, Werner; Konig, Joachim; Eckstein, Udo; and Theidel, Hans, 4,888,128, Cl. 252-301.230.

Konig, Klaus; and Heitkamper, Peter, to Bayer Aktiengesellschaft. Diisocyanates, a process for their production and their use in the production of polyurethane plastics. 4,888,125, Cl. 252-182.210.

Konig, Winfried: *See—*
Knoll, Peter; Konig, Winfried; and Rapps, Peter, 4,888,699, Cl. 364-449.000.

Konings, Willem N.; and van Boven, Aart, to Rijksuniversiteit te Groningen. Dipeptidase, its isolation from lactic acid bacteria, antibodies against the dipeptidase, the use of the dipeptidase and of the antibodies against it. 4,888,284, Cl. 435-183.000.

Konno, Akira; Taguchi, Tetsuya; and Yamaguchi, Takenobu, to Takeda Chemical Industries, Ltd. Bakery products and noodles containing polyglutamic acid. 4,888,193, Cl. 426-549.000.

Konno, Tsuneo: *See—*
Ishida, Atsushi; and Konno, Tsuneo, 4,887,563, Cl. 123-90.160.

Konwinski, Arthur H.: *See—*
Beery, Kenneth E.; and Konwinski, Arthur H., 4,888,198, Cl. 426-656.000.

Kooi, J. Peter E.; and Myers, James W., Jr., to Teledyne Industries Inc. Knockout pin apparatus. 4,887,448, Cl. 72-344.000.

Koomey, Inc.: *See—*
Tomlin, Jerry B.; and Olejak, Ingo W. V., 4,887,643, Cl. 137-625.660.

Koppe, Reiner H.: *See—*
Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H.; and Linde, Rolf E., 4,888,794, Cl. 378-41.000.

Koppen, Reinhard: *See—*
Langenbach, Michael; Cremer, Dirk; and Koppen, Reinhard, 4,887,986, Cl. 441-74.000.

Koppers, Manfred; Sebastian, Lotar; and Guse, Kuno, to Bochumer Eisenhutte Heintzmann GmbH & Co. KG. Method of controlling the movement of a longwall excavation front, especially the face or breast of a coal seam. 4,887,935, Cl. 405-302.000.

Korsen, Vilie K.: *See—*
Radik, Tynu A.; Sjugis, Anatol J.; Pungas, Toom A.; and Korsen, Vilie K., 4,888,530, Cl. 318-254.000.

Kortright, Kenneth H.; Hofheinz, David E.; Sullivan, Carole; and Toedter, Gary P., to Coulter Corporation. Monoclonal antibody specific to HIV antigens. 4,888,290, Cl. 435-240.270.

Korzenowski, James P.: *See—*
Lewis, Richard D.; Korzenowski, James P.; and DeHemmer, Larry J., 4,887,639, Cl. 137-505.410.

Koshio, Toshiyuki: *See—*
Matsumoto, Toru; Koshio, Toshiyuki; Goseki, Yasuhide; Ushiyama, Hisayuki; Yamazaki, Masuo; Ohsaki, Ichiro; Nakahara, Toshiaki; Kurimoto, Junichi; and Wakamiya, Katsutoshi, 4,888,264, Cl. 430-137.000.

Kosin, John A.; and Andrews, Claude R., to J.M. Huber Corporation. Process for producing calcium carbonate and products thereof. 4,888,160, Cl. 423-430.000.

Kosmo, Joseph J.; Tri, Terry O.; Spenny, William E.; and West, Philip R., to United States of America, Administrator, National Aeronautics and Space Administration. Don/Doff support stand for use with rear entry space suits. 4,887,749, Cl. 223-111.000.

Kostinko, John A., to J. M. Huber Corporation. Plastic compositions containing small particle size zeolites and mixtures. 4,888,378, Cl. 524-450.000.

Kosub, Beate: *See—*
Elger, Walter; Beier, Sybille; Fahnrich, Marianne; Kosub, Beate; Chwalisz, Krzysztof; and Hasan, Syed H., 4,888,331, Cl. 514-170.000.

Kosuge, Hiroshi; and Kiriu, Yoshio, to Hitachi, Ltd. Error detection system. 4,888,774, Cl. 371-38.100.

Kosuge, Tokuo: *See—*
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,887,769, Cl. 239-493.000.

Kosugi, Masao: *See—*
Suzuki, Akiyoshi; Ina, Hideki; and Kosugi, Masao, 4,888,614, Cl. 355-43.000.

Kosugi, Mitsuo: *See—*
Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.

Kosuzume, Hiroshi: *See—*
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,888,332, Cl. 514-206.000.

Kotterer, Werner J., to Grafotec Kotterer GmbH. A stop motion device for a web feed printing press. 4,887,532, Cl. 101-225.000.

Kotulla, Gunther: *See—*
Sinz, Wolfgang; and Kotulla, Gunther, 4,888,686, Cl. 364-200.000.

Kowalski, Charles I.: *See—*
Nemeth, Joseph; and Kowalski, Charles I., 4,887,795, Cl. 252-511.000.

Koyanagi, Kaoru: *See—*
Yamazaki, Shunpei; Suzuki, Kunio; Nagayama, Susumu; Inujima, Takashi; Abe, Masayoshi; Fukada, Takeshi; Kinka, Mikio; Kobayashi, Ippei; Shibata, Katsuhiko; Susukida, Masato; and Koyanagi, Kaoru, 4,888,305, Cl. 437-101.000.

Kozuki, Susumu: *See—*
Maeda, Masaya; Takimoto, Hiroyuki; and Kozuki, Susumu, 4,888,651, Cl. 358-335.000.

Kozushin, Anatoly: *See—*
Mobley, Joseph G.; Kozushin, Anatoly; Baher, Saeed; Addison, Steve; Paulk, Howard; and Farmer, James, 4,888,799, Cl. 380-6.000.

Krabbenhoft, Herman O.: *See—*
Boden, Eugene P.; and Krabbenhoft, Herman O., 4,888,400, Cl. 525-462.000.

Kraemer, Bernhard: *See—*
Allner, Kurt; Brinkmann, Hans; Kraemer, Bernhard; and Schulte, Herbert, 4,888,145, Cl. 264-126.000.

Kramer, James H., to B. F. Goodrich Company, The. Impact absorbing device. 4,887,934, Cl. 405-213.000.

Kramer, Wolfgang: *See—*
Brandes, Wilhelm; Kaspers, Helmut; Reinecke, Paul; Scheinpflug, Hans; and Kramer, Wolfgang, 4,888,349, Cl. 514-383.000.

Kraus, Thomas J., to Frommelt Industries, Inc. Roll-up door. 4,887,660, Cl. 160-265.000.

Krauss, Werner: *See—*
Wurster, Helmut; and Krauss, Werner, 4,888,746, Cl. 367-138.000.

Krehl, Gerhard; and Vogeler, Helmut, to SKF Textilmaschinen-Komponenten GmbH. Cable conduit for textile machines. 4,888,452, Cl. 174-101.000.

Krishnamurthy, Sowmithri: *See—*
Huss, Albin, Jr.; Krishnamurthy, Sowmithri; and McHale, William D., 4,888,105, Cl. 208-137.000.

Kristiansen, Odd: *See—*
Ehrenfreund, Josef; Boger, Manfred; Kristiansen, Odd; Drabek, Jozef; and Kristinsson, Haukur, 4,888,348, Cl. 514-367.000.

Kristinsson, Haukur: *See—*
Ehrenfreund, Josef; Boger, Manfred; Kristiansen, Odd; Drabek, Jozef; and Kristinsson, Haukur, 4,888,348, Cl. 514-367.000.

Krolak, David J.: *See—*
Arlington, David L.; Cole, Jacqueline M.; Hazelzet, Bruce G.; Krolak, David J.; Li, Hehching H.; Oza, Bharat J.; and Weaver, A. Frank, 4,888,773, Cl. 371-40.200.

Kroll, John W.; Baran, Michael S.; and Mading, James E., to Eaton Corporation. Bistable SME actuator with retainer. 4,887,430, Cl. 60-527.000.

Kronwald, Klaus, to Labomatic GmbH. Chromatographic column. 4,888,112, Cl. 210-198.200.

Krusing, Richard A.: *See—*
Flyer, Eric G.; Krusing, Richard A.; and Moseley, Elmer L., 4,887,470, Cl. 73-862.680.

Kryder, Mark H.; and Shieh, Han-Ping D. Method and system for erase before write magneto-optic recording. 4,888,750, Cl. 369-13.000.

KT Technologies Inc.: *See—*
O'Connor, Lawrence J., 4,887,714, Cl. 206-411.000.

Kubo, Masami; Ochiai, Takashi; and Yuasa, Hirofumi, to Tanabe Seiyaku Co., Ltd. Agent for prophylaxis and treatment of cardiac hypertrophy. 4,888,339, Cl. 514-392.000.

Kubodera, Akiko; Tanaka, Touichi; and Komori, Yukimichi, to Nihon Medi-Physics Co., Ltd. Diagnostic agent for breast cancer or tumor. 4,888,163, Cl. 424-1.100.

Kubota Ltd.: *See—*
Nozaka, Kenkichi; Kawahara, Yoshihiro; Fukutaka, Takashi; and Horie, Fumiharu, 4,887,680, Cl. 180-53.300.
Takei, Terutaka; Morita, Shigeru; and Kawakita, Hiroaki, 4,887,686, Cl. 180-211.000.

Kubota, Shin'ichi; Miyano, Hideyo; and Adachi, Hiromitsu, to Honda Giken Kogyo Kabushiki Kaisha. Method and system for detecting the level of engine oil of an engine. 4,888,576, Cl. 340-451.000.

Kubota, Yuko: *See—*
Yoshino, Thunekazu; Morita, Hiroshi; Nakano, Hirotaka; Hayashi, Nobuo; and Kubota, Yuko, 4,887,760, Cl. 228-56.300.

Kubushiki Kaisha Kosumo Keiki: *See—*
Furuse, Akio, 4,888,718, Cl. 364-564.000.

Kuchiki, Kiyoshi, to Mitsubishi Denki Kabushiki Kaisha. Numerical control apparatus. 4,888,534, Cl. 318-567.000.

Kudo, Tsutomu: *See—*
Okonogi, Shigeo; Tomita, Mamoru; Shimamura, Seiichi; Ishibashi, Norio; and Kudo, Tsutomu, 4,888,171, Cl. 424-93.000.

Kudoh, Koichi: *See—*
Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,888,262, Cl. 430-58.000.

Kugelmann, Franz J., to Nudvuck Enterprises. Evacuated insulation and a method of manufacturing same. 4,888,073, Cl. 156-197.000.

Kuhara, Takashi. Device for providing communication between water tanks of heat accumulation tank system. 4,887,667, Cl. 165-96.000.

Kuhfus, Gerd: *See—*
McLean, Kenneth W.; Kuhfus, Gerd; and Walker, Charles R. S., 4,887,972, Cl. 439-137.000.

Kuhl, Henry Y. Article drying apparatus with adjustable drying plenum means. 4,887,366, Cl. 34-229.000.

Kuhlmann, Werner: *See—*
Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, 4,888,081, Cl. 156-359.000.

Kuhn, David N.: *See—*
Beremand, Phillips D.; Ohlrogge, John B.; and Kuhn, David N., 4,888,282, Cl. 435-193.000.

Kulik, Joseph S.: *See—*
Keeffe, William M.; Karlotski, Robert J.; Kulik, Joseph S.; and Bazin, Simone P., 4,888,517, Cl. 313-25.000.

Kumar, Prithvi R.; and Abare, Wayne, to Harris Corporation. Switching power supply filter. 4,888,675, Cl. 363-47.000.

Kumar, Virendra: *See—*
Bailey, Denis M.; and Kumar, Virendra, 4,888,352, Cl. 514-406.000.

Kume, Masafumi: *See—*
Masubuchi, Yoichi; Watanabe, Tadashi; Tominaga, Akira; Nagaoka, Haruo; Nakatani, Eisaku; and Kume, Masafumi, 4,888,244, Cl. 428-416.000.

Kummer, Christian F.: *See—*
Leiber, Hans-Jurgen; Meyer, Jean-Philippe; and Kummer, Christian F., 4,887,500, Cl. 82-12.000.

Kummer Freres SA Fabrique de Machines: *See—*
Leiber, Hans-Jurgen; Meyer, Jean-Philippe; and Kummer, Christian F., 4,887,500, Cl. 82-12.000.

Kummerl, Klaus, to Ing. Hermann Kummerl, Laborgeratebau, Inh. Ing. Klaus Kummerl. Photographic developing machine. 4,888,608, Cl. 354-299.000.

Kunert, Heinz: *See—*
Ohlenforst, Hans; and Kunert, Heinz, 4,888,072, Cl. 156-108.000.

Kung, Robert T. V.; and Singh, Param I., to Abiomed, Inc. Artificial heart. 4,888,011, Cl. 623-3.000.

Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, to Kabushiki Kaisha Kyoritsu. Air-conditioning apparatus. 4,887,522, Cl. 98-40.200.

Kuno, Yukio: *See—*
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,887,522, Cl. 98-40.200.

Kunz, Udo, to Kunz, Udo. Torque transmitting coupling for reels and the like. 4,887,926, Cl. 403-27.000.

Kuo, Ping-Song. Stop-check valve. 4,887,792, Cl. 251-82.000.

Kuraishi, Yoshiaki, to NEC Corporation. Oversampling A/D converter with two capicitor arrays. 4,888,587, Cl. 341-122.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Shirakami, Toshiharu; and Sogawa, Akira, 4,887,614, Cl. 128-798.000.

Kurihara, Haruto; and Uchida, Koji, to Mazda Motor Corporation. Method of mounting a torque converter on a transmission. 4,887,344, Cl. 29-468.000.

Kurimoto, Junichi: *See—*
Matsumoto, Toru; Koshio, Toshiyuki; Goseki, Yasuhide; Ushiyama, Hisayuki; Yamazaki, Masuo; Ohsaki, Ichiro; Nakahara, Toshiaki; Kurimoto, Junichi; and Wakamiya, Katsutoshi, 4,888,264, Cl. 430-137.000.

Kurita, Hitoshi: *See—*
Takano, Teruhisa; Kurita, Hitoshi; Fujii, Yasuteru; Suenaga, Haruo; and Yano, Masashi, 4,888,461, Cl. 219-10.55B.

Kuroiwa, Hiroshi; Oyama, Yoshishige; and Nogi, Toshiharu, to Hitachi, Ltd. Control apparatus for internal combustion engines. 4,887,574, Cl. 123-425.000.

Kuroki, Masahiro: *See—*
Matsuura, Masaaki; Nakamori, Masaharu; Kuroki, Masahiro; and Ishikawa, Mitsuru, 4,887,567, Cl. 123-190.00D.

Kurtz, Rudiger: *See—*
Weisshuhn, Elmer; Bubik, Alfred; Dahl, Hans; Holik, Herbert; Kurtz, Rudiger; Zembrot, Anton; Stotz, Wolf-Gunter; Seider, Werner; and Trondle, Robert, 4,888,094, Cl. 162-198.000.

Kusakabe, Susumu, to Sony Corporation. Special effect apparatus. 4,888,643, Cl. 358-183.000.

Kuslima, Shogen: *See—*
Szebenyi, Emil; and Kuslima, Shogen, 4,888,172, Cl. 424-105.000.

Kuusik, Uno: *See—*
Leising, Maurice B.; and Kuusik, Uno, 4,887,512, Cl. 91-471.000.

Kuwabara, Kenichi; and Miyata, Makoto, to Kabushiki Kaisha Kuwabara Seisakusho. Radiant wall burner apparatus. 4,887,961, Cl. 431-177.000.

Kuwata, Jun; Fujita, Yosuke; Tohda, Takao; Abe, Atsushi; and Matsuoka, Tomizo, to Matsushita Electric Industrial Co., Ltd. Dielectric thin film, and method for making the thin film. 4,888,246, Cl. 428-432.000.

Kyrtsos, Christos T.; Lutgen, F. Paul; and Gudat, Adam J., to Caterpillar Inc. Method for monitoring a work vehicle suspension. 4,887,454, Cl. 73-11.000.

Kyuma, Kazuo: *See—*
Kojima, Keisuke; Kyuma, Kazuo; Noda, Susumu; Kameya, Masaaki; Ohta, Jun; and Hammanaka, Koichi, 4,888,783, Cl. 372-44.000.

La Telemecanique Electrique: *See—*
Belbel, Elie; Boucheron, Thierry; Lauraire, Michel; and Riotte, Jean-Paul, 4,888,661, Cl. 361-102.000.

Labofina, S.A.: *See—*
van der Kolk, Cornelis E. M.; Van der Poel, Hendrik; and Braeken, Jozef, 4,888,056, Cl. 106-1.170.

Labomatic GmbH: *See—*
Kronwald, Klaus, 4,888,112, Cl. 210-198.200.

Lacey, Christopher A.; and Brock, George W., to Eastman Kodak Company. Contoured head assembly for use in a cassette loaded recorder. 4,888,657, Cl. 360-122.000.

Lach, Dietrich: *See—*
Ebel, Klaus; Reuther, Wolfgang; Fikentscher, Rolf; Lach, Dietrich; Streicher, Rolf; and Schaffer, Ortwin, 4,888,412, Cl. 528-230.000.

Lach, Jorge: *See—*
Barkans, Anthony C.; Schroeder, Brian D.; Durant, Thomas L.; Gordon, Dorothy; and Lach, Jorge, 4,888,712, Cl. 364-522.000.

Lachman, Irwin M.: *See—*
DeAngelis, Thomas P.; Lachman, Irwin M.; and Wusirika, Raja R., 4,888,317, Cl. 502-60.000.

Lacoste, Jacques-Andre . Device to force open the door of a safety deposit box. 4,887,342, Cl. 29-259.000.

Lacotte, Jean-Pierre; and Puech, Claude, to Thomson Brandt. Process for producing information supports capable of being optically read by variations in absorption. 4,888,266, Cl. 430-141.000.

Lagasse, Lyle E.; and Andrews, Dennis D. General purpose dual mode clock and timer unit. 4,888,748, Cl. 368-107.000.

Lagerlund, Inger: *See—*
Cameron, David G; Hudson, Harry R.; Lagerlund, Inger; and Pianka, Max, 4,888,330, Cl. 514-114.000.

Lahaije, Paul D. M. E.: *See—*
Driessen, Leonardus M. H. E.; Janse, Cornelis P.; and Lahaije, Paul D. M. E., 4,888,698, Cl. 364-443.000.

Lai, Chong K.; and Dobkin, Robert C., to Linear Technology Corporation. High thermal resistance bonding material and semiconductor structures using same. 4,888,634, Cl. 357-72.000.

Lakatos, Nicholas: *See—*
Gluzerman, Boris; Lakatos, Nicholas; and Hensler, Paul W., 4,887,894, Cl. 350-636.000.

Lambert, John M.; Blattler, Walter A.; and Senter, Peter D., to Dana-Farber Cancer Institute, Inc. Gelonin immunotoxin. 4,888,415, Cl. 530-390.000.

Lamy, Bernard: *See—*
Bichon, Daniel; and Lamy, Bernard, 4,888,398, Cl. 525-420.000.

Lando, David J.; and Wight, Frederick R., Jr., to AT&T Bell Laboratories. Circuit board fabrication leading to increased capacity. 4,888,450, Cl. 174-68.500.

Landt, Jeremy A.; Koelle, Alfred R.; and Eckhardt, David A., to Amtech Technology Corporation. Signal discrimination system. 4,888,591, Cl. 342-44.000.

Lang, Gerard; Forestier, Serge; Hocquaux, Michel; Grollier, Jean-Francois; and Rosenbaum, Georges, to L'Oreal. Use of hydroxynaphthoquinones for dyeing human keratin fibres. 4,888,026, Cl. 8-405.000.

Lang, Gerard: *See—*
Junino, Alex; Lang, Gerard; and Jehanno, Nicole, 4,888,445, Cl. 564-441.000.

Langenbach, Michael; Cremer, Dirk; and Koppen, Reinhard, to Mistral Windsurfing AG. Surf-riding board or sailing board. 4,887,986, Cl. 441-74.000.

Langenfeld, Joseph W.; and Westendorf, Neal W., to Westendorf Mfg. Co., Inc. Extension arm assembly for a tractor loader. 4,887,939, Cl. 414-722.000.

Langenthal, Wolfram V.: *See—*
Henning, Wolfgang; Langenthal, Wolfram V.; Perrey, Hermann; and Striegler, Hellmut, 4,888,379, Cl. 524-500.000.

Langer, Robert S.; Domb, Abraham J.; and Laurencin, Cato T., to Massachusetts Institute of Technology. Controlled drug delivery high molecular weight polyanhydrides. 4,888,176, Cl. 424-426.000.

Langerman, David W. "Spare parts" for use in ophthalmic surgical procedures. 4,888,016, Cl. 623-6.000.

Langley, Steven P.: *See—*
Spahn, James G.; Langley, Steven P.; and Jacobs, Michael L., 4,887,715, Cl. 206-370.000.

Lanham, Robert L.: *See—*
Gibbons, Charles E.; Marano, Gerald A.; Kittrell, James M.; Whillock, Allan A.; Lanham, Robert L.; and Evans, Donald, 4,888,222, Cl. 428-34.200.

Lara, Maria T.: *See—*
Huguet, Joan; Muchowski, Joseph M.; and Lara, Maria T., 4,888,358, Cl. 514-530.000.

Large, David T., to Boeing Company, The. Roll drum sensor housing having sliding window. 4,887,779, Cl. 244-1.00R.

Largenton, Jean-Luc. Device for weighing vehicles. 4,887,678, Cl. 177-134.000.

Larsen, Jeffrey A. Method and apparatus for opening and reclosing beverage cans. 4,887,734, Cl. 220-306.000.

Laser Precision Corporation: *See—*
Dingle, Larry A., 4,888,714, Cl. 364-525.000.

Latham, Philip A. Streamlined freeboard measuring device. 4,887,361, Cl. 33-720.000.

Latzke, Arno Walter, to Indentor AG. Means for storing and distributing heat and use thereof. 4,887,368, Cl. 36-44.000.

Lauraire, Michel: *See—*
Belbel, Elie; Boucheron, Thierry; Lauraire, Michel; and Riotte, Jean-Paul, 4,888,661, Cl. 361-102.000.

Laurencin, Cato T.: *See—*
Langer, Robert S.; Domb, Abraham J.; and Laurencin, Cato T., 4,888,176, Cl. 424-426.000.

Laurent, Pierre-Andre: *See*—
Brechard, Dominique; and Laurent, Pierre-Andre, 4,888,778, Cl. 371-37.400.
Laurenzo, Kathleen S., to Ethyl Corporation. Substituted ammonium carbamates and method for preparing same. 4,888,138, Cl. 562-555.000.
Lavelle, Gary E., to Emhart Industries, Inc. Electronic lockset assembly and control. 4,887,442, Cl. 70-143.000.
Lawrence, Jeanne B.: *See*—
Singer, Robert H.; and Lawrence, Jeanne B., 4,888,278, Cl. 435-6.000.
Lawrence, William T.: *See*—
McQuilkin, Peter H.; and Lawrence, William T., 4,888,000, Cl. 604-164.000.
Leadbetter, Mark R.: *See*—
Braginetz, Paul A.; Leadbetter, Mark R.; and Peduto, Joseph, 4,888,002, Cl. 604-195.000.
Leads Metal Products, Inc.: *See*—
Alexander, Larry G., 4,887,759, Cl. 228-20.000.
Lebeck, Alan O.; and Young, Lionel A., to University of New Mexico. Wavy-tilt-dam seal ring and apparatus for shaping seal rings. 4,887,395, Cl. 51-101.00R.
Lederman, David M.; Singh, Param I.; and Strohl, Clair L., Jr., to Abiomed, Inc. Prosthetic heart valve. 4,888,009, Cl. 623-2.000.
Lednicer, Daniel; and Sun, Jung-Hui, to Erbamont, Inc. Carboxamides useful as antiemetic or antipsychotic agents. 4,888,353, Cl. 514-422.000.
Lednor, Peter W., to Shell Oil Company. Process for the preparation of silicon oxynitride-containing products. 4,888,159, Cl. 423-325.000.
Lee, Mildred: *See*—
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.
Lee, Roger C.: *See*—
Weinberger, Gerald J.; Lee, Roger C.; and Miller, Stanley F., 4,888,822, Cl. 379-130.000.
Lee-Rowan Company: *See*—
Arnold, William D., 4,887,538, Cl. 108-111.000.
Lee, Tien-Pei, to Bell Communications Research, Inc. Miniature integrated optical beam splitter. 4,888,785, Cl. 372-50.000.
Lee, Ving G.: *See*—
Sundeen, Joseph E.; Floyd, David; and Lee, Ving G., 4,888,424, Cl. 544-288.000.
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Tritton, Victor R.; Tritton, Gary E.; and Chevillard, Paul F., 4,887,855, Cl. 292-307.00R.
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Littleford, Gordon E.; and Underwood, Roy F., to Kerry Ultrasonics Limited. Apparatus for generating ultrasonic signals. 4,888,565, Cl. 331-25.000.
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Hall, David B., 4,887,900, Cl. 356-350.000.
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Ivers, Douglas E.; Miller, Lane R.; and Schroeder, Warren R., 4,887,699, Cl. 188-378.000.
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Grollier, Jean-Francois; and Maignan, Jean, 4,888,164, Cl. 424-63.000.
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Junino, Alex; Lang, Gerard; and Jehanno, Nicole, 4,888,445, Cl. 564-441.000.
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McCann, Denis J.; Dawson, Stuart B.; and Ward, Andrew J., 4,887,871, Cl. 303-113.000.
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DiVito, Fred; and Beal, Christopher L., 4,887,323, Cl. 4-577.000.
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Sigg, Hans, 4,887,489, Cl. 74-801.000.
Mabuchi, Minoru, to Canon Kabushiki Kaisha. Electrophotographic photsensitive member. 4,888,261, Cl. 430-56.000.
Macaulay, Norman. Calendar/executive planner with repositional personal directory section. 4,887,373, Cl. 40-119.000.
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MacLean, Mary. Sanitary toilet seat cover. 4,887,321, Cl. 4-243.000.
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Kroll, John W.; Baran, Michael S.; and Mading, James E., 4,887,430, Cl. 60-527.000.
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Maeda, Masaya; Takimoto, Hiroyuki; and Kozuki, Susumu, to Canon Kabushiki Kaisha. Video system. 4,888,651, Cl. 358-335.000.
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Marlowe, James L., to Sterling Plumbing Group, Inc. Adjustment apparatus for supporting a slidable door. 4,887,394, Cl. 49-409.000.

Marom, Emanuel; Owechko, Yuri; and Soffer, Bernard H., to Hughes Aircraft Company. Optical analog data processing systems for handling bipolar and complex data. 4,888,724, Cl. 364-807.000.

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Marquez, Robert O., to Hewlett-Packard Company. Tape cartridge for use in disc drive. 4,888,659, Cl. 360-132.000.

Marshall, Alan D.; Mitchell, Christopher J.; and Proudler, Graeme J., to Hewlett-Packard Company. Secure messaging systems. 4,888,800, Cl. 380-21.000.

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Martens, Franciscus J. A., to Shell Oil Company. Process for partial oxidation of a liquid or solid and/or a gaseous hydrocarbon-containing fuel. 4,888,031, Cl. 48-197.00R.

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Martin Marietta Corporation: *See*—
Frohardt, Melvin W.; Hartz, Keith H.; and Hardee, Patrick C., deceased, 4,887,589, Cl. 126-418.000.

Martin, Robert L. Automated lawn mower or floor polisher. 4,887,415, Cl. 56-10.200.

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Mason, Benjamin, to Caledonian Mining Co. Ltd. Lining of bore holes. 4,887,546, Cl. 118-306.000.

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Ise, Masahiro; Tanaka, Hidehiko; Machino, Katsuyuki; Matsubara, Toshiyuki; and Terasaka, Teiji, 4,888,586, Cl. 340-825.050.

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Ueda, Minoru; Matsuda, Hideaki; and Mori, Hideki, 4,888,403, Cl. 527-103.000.

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Ishikawa, Seiichi; Matsumoto, Masaharu; Satoh, Katsuaki; and Kawamura, Akihisa, 4,888,808, Cl. 351-103.000.

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Inoue, Hiroaki; Sakano, Shirji; Nakamura, Hitoshi; Katsuyama, Toshio; and Matsumura, Hiroyoshi, 4,887,877, Cl. 350-96.110.

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Matsuoka, Hiroshi: *See*—
Enari, Masahiko; Aoki, Akio; Matsushita, Machiko; Matsuoka, Hiroshi; and Minoura, Kazuo, 4,888,753, Cl. 369-44.000.

Matsuoka, Nobutaka: *See*—
Nakagawa, Kaoru; Yamamoto, Yoshio; and Matsuoka, Nobutaka, 4,888,304, Cl. 437-86.000.

Matsuoka, Tomizo: *See*—
Kuwata, Jun; Fujita, Yosuke; Tohda, Takao; Abe, Atsushi; and Matsuoka, Tomizo, 4,888,246, Cl. 428-432.000.

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Inoue, Michihiro; and Yamada, Toshio, 4,888,732, Cl. 365-51.000.
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Ono, Mitsuaki; Ueda, Masataka; and Miyazaki, Osamu, 4,888,658, Cl. 360-126.000.
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Takano, Teruhisa; Kurita, Hitoshi; Fujii, Yasuteru; Suenaga, Haruo; and Yano, Masashi, 4,888,461, Cl. 219-10.55B.
Teranishi, Akio; Genji, Nobuo; and Itoh, Kohji, 4,888,788, Cl. 375-1.000.
Terui, Yasuaki, 4,888,633, Cl. 357-24.000.

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Matsuura, Masahiro: *See—*
Hotta, Hirohisa; Ono, Yotaro; and Matsuura, Masahiro, 4,887,800, Cl. 266-270.000.

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Matthews, Brian: *See—*
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Mayfield, Alfred B., to Johnson, Charles D., a part interest. Hydroplanetary power division system. 4,887,487, Cl. 74-687.000.

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Dotzer, Peter; Glaser, Heinz; Hahn, Reinhold; and Mayr, Ernst, 4,887,423, Cl. 57-295.000.

Mazda Motor Corporation: *See—*
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Kurihara, Haruto; and Uchida, Koji, 4,887,344, Cl. 29-468.000.
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MIT Beschrankter Haftung: *See—*
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Sundquist, Robert S.; and McBride, Thomas S., 4,888,594, Cl. 342-389.000.

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McClure, Charles: *See—*
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.

McCormick, Ben F., II: *See—*
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McCready, David F. Engine oil additive dry lubricant powder. 4,888,122, Cl. 252-25.000.

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McDermott, Robert J.: *See—*
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McDonald, Russell: *See—*
Herbert, Glenn M.; Kneisel, Charles S.; McDonald, Russell; Povio, Raymond A.; and Zirilli, Michele D., 4,887,805, Cl. 271-94.000.

McGee, James: *See—*
Kohl, Gretchen S.; and McGee, James, 4,888,368, Cl. 524-92.000.

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McHale, William D.: *See—*
Huss, Albin, Jr.; Krishnamurthy, Sowmithri; and McHale, William D., 4,888,105, Cl. 208-137.000.

McIntosh, Angus J.: *See—*
Porteous, Alexander; and McIntosh, Angus J., 4,887,867, Cl. 299-42.000.

McKeen, Francis X.: *See—*
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Readshaw, Lenard T.; VanVelzen, Cornelis N.; Paquette, John L.; and McKeown, Kenneth O., 4,887,494, Cl. 76-27.000.

McLean, Kenneth W.; Kuhfus, Gerd; and Walker, Charles R. S., to Northern Telecom Limited. Snap-together enclosure for a telephone jack receptacle. 4,887,972, Cl. 439-137.000.

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Goodrich, Winston D.; Wesselski, Clarence J.; Pelischek, Timothy E.; Becker, Bruce H.; Kahn, Jon B.; Grimaldi, Margaret E.; McManamen, John P.; and Castro, Edgar O., 4,887,780, Cl. 244-137.200.

McMullin, Francis: *See—*
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McNair, Rhett; and Willcocks, Martin E. G. Electromechanical lamp switching. 4,888,494, Cl. 307-38.000.

McNeilab, Inc.: *See—*
Mohrbacher, Richard J.; and Grous, Philip P., 4,888,335, Cl. 514-217.000.

McNutt, Eugene: *See—*
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.

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McRae, Doris J.; and Roberts, Richard E., to Smith Corona Corporation. Punctuation check feature for an electronic typewriter. 4,887,920, Cl. 400-63.000.

McRae, Doris J.; and Roberts, Richard E., to Smith Corona Corporation. Memory typewriter with count of overused words. 4,888,730, Cl. 364-900.000.

MCW Research Foundation, Inc.: *See—*
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Mead Corporation, The: *See—*
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Prusas, Zenon; Uhrig, L. Oscar; and Wisecup, Gene W., 4,888,092, Cl. 162-130.000.

Meadows, Roger D.: *See—*
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MEC-MOR S.p.A.: *See—*
Tenconi, Riccardo, 4,887,439, Cl. 66-51.000.

Meckler, Milton. Desiccant assisted air conditioner. 4,887,438, Cl. 62-271.000.

Meddaugh, Michael D.: *See—*
Klosowski, Jerome M.; and Meddaugh, Michael D., 4,888,404, Cl. 528-15.000.

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Meffert, Alfred: *See—*
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Meguro, Noriaki: *See—*
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Mehltretter, James C., to Inco Alloys International, Inc. Rotary mill with charging system. 4,887,773, Cl. 241-171.000.

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Meicher, Joachim, to VDO Adolf Schindling AG. System for regulating the idling speed of rotation of an internal combustion engine. 4,887,570, Cl. 123-339.000.

Meimeteas, Angelo. Paint brush ferrule cover. 4,887,327, Cl. 15-246.000.

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Melber, George E.; and Wolinski, Leon, to Pierce & Stevens Corporation. Low density composite opacifiers. 4,888,241, Cl. 428-407.000.

Menke, Jeffery W., to Caterpillar Inc. Controllable locking apparatus for implement carrying work vehicle. 4,887,938, Cl. 414-694.000.

Merchant, Daniel P.: *See—*
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Merck & Co., Inc.: *See—*
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Merck Sharp & Dohme Limited: *See—*
Woodruff, Geoffrey N.; Wong, Erik H. F.; and Kemp, John A., 4,888,347, Cl. 514-289.000.

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Cwielong, Heinrich; Mertens, Wilfried; and Merten, Gerhard, 4,887,991, Cl. 474-92.000.

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Kleitz, Jean-Pierre; and Mertzeisen, Piere H. A., 4,888,134, Cl. 252-511.000.

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Messinger, James E.: *See*—
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Mestek, Inc.: *See*—
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Hill, James R., 4,887,630, Cl. 137-72.000.
Metallgesellschaft Aktiengesellschaft: *See*—
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Meyer, William R.; and Dechow, Calvin F. Creosote removal composition. 4,888,030, Cl. 44-640.000.
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Microtek Medical Inc.: *See*—
Taylor, Richard H., 4,887,615, Cl. 128-850.000.
Middlebrook, Thomas F. Thermal microscope stage. 4,888,463, Cl. 219-201.000.
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Milby, Gregory H.: *See*—
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Miller, Stanley F.: *See*—
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Milliken, Robert D., to W. R. Grace & Co.,-Conn. Process and machine for electrostatic coating. 4,888,200, Cl. 427-31.000.
Millipore Corporation: *See*—
Hudson, Derek, 4,888,385, Cl. 525-54.110.
Milner, Edward F. G.: *See*—
Dunlop, John A.; Milner, Edward F. G.; Smyth, Robert W.; and Toop, Gerald W., 4,887,492, Cl. 75-77.000.
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Teichner, Marshall I., 4,887,536, Cl. 108-35.000.
Minnesota Mining and Manufacturing Company: *See*—
Bellanger, Michael P., 4,887,339, Cl. 24-575.000.
Bryan, Thomas T., 4,888,489, Cl. 250-504.00H.
ReMine, Walter J.; and Belka, Anthony M., 4,888,579, Cl. 340-572.000.
Sandvig, Timothy C.; Bartizal, Dennis C.; Scholz, Matthew T.; Campagna, Anthony J.; and Libbey, Chris J., 4,888,225, Cl. 428-71.000.
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Mistral Windsurfing AG: *See*—
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Mitchell, Joan L.; Anderson, Karen L.; and Geortzel, Gerald, to International Business Machines Corporation. Method for encoding and decoding a digital image. 4,888,645, Cl. 358-261.100.
Mitchell, Joe C.: *See*—
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Mitsubishi Gas Chemical Co., Ltd.: *See*—
Kawaki, Takao; Kijima, Yasuhiko; Miyauchi, Yuh; Ukita, Eizi; Nakajima, Toru; and Masumoto, Mituhiko, 4,888,401, Cl. 525-468.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Tanaka, Tadao; Mitsui, Takeshi; Takizawa, Shozo; and Fukuyama, Kazuo, 4,887,632, Cl. 137-117.000.
Mitsubishi Kasei Corporation: *See*—
Hihara, Toshio; and Sekioka, Riyouichi, 4,888,028, Cl. 8-549.000.
Kondou, Tsutomu, 4,888,183, Cl. 426-34.000.
Mitsubishi Kenki Kabushiki Kaisha: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; Wada, Shunichi; and Ohtagaki, Shigeki, 4,887,840, Cl. 280-707.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Yabuki, Ritsue; and Wakita, Saburo, 4,888,153, Cl. 420-57.000.
Mitsubishi Rayon Company Limited: *See*—
Hongo, Masafumi; Shigemitsu, Hideyuki; Yamamoto, Naoki; and Yanagase, Akira, 4,888,388, Cl. 525-67.000.
Mochida, Naoki; and Sawada, Hiroaki, 4,888,147, Cl. 264-207.000.
Mitsui Kinzoku Kogyo Kabushiki Kaisha: *See*—
Sannohe, Kanetaro; Senzaki, Hirohisa; and Sohama, Yoshio, 4,888,216, Cl. 427-216.000.
Mitsui Mining & Smelting Co., Ltd.: *See*—
Tsunaga, Masayuki; Yuba, Kazuaki; and Kaneko, Youichi, 4,888,135, Cl. 252-512.000.

Mitsui, Takeshi: *See—*
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Miura, Haruo: *See—*
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Miyagi, Satoshi: *See—*
Kobayashi, Osamu; Miyagi, Satoshi; and Hanabusa, Kazuyoshi, 4,888,571, Cl. 336-65.000.

Miyaji, Takashi, to Sharp Kabushiki Kaisha. Developer mixer for electrophotographic copying machine. 4,887,911, Cl. 366-316.000.

Miyakawa, Minekazu, to Iizuka Electric Industry Co., Ltd. Switch for detecting erroaeous erase protection fin of tape cassette. 4,888,457, Cl. 200-283.000.

Miyake, Eiichi. Exposing apparatus used in fabrication of printed circuit boards. 4,888,488, Cl. 250-492.100.

Miyake, Hideo: *See—*
Maeda, Satoshi; Yoneda, Ryu; Yokota, Kenichi; and Miyake, Hideo. 4,888,208, Cl. 427-96.000.

Miyake, Mutsuko: *See—*
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Miyakoshi Printing Machinery Co., Ltd.: *See—*
Ichikawa, Haruo; Kanno, Ryoichi; and Kiyomiya, Masayuki, 4,887,531, Cl. 101-216.000.

Miyano, Hideyo: *See—*
Kubota, Shin'ichi; Miyano, Hideyo; and Adachi, Hiromitsu, 4,888,576, Cl. 340-451.000.

Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., to G. D. Searle and Company. Use of substituted dihydrobenzopyrans for allergy and inflammation. 4,888,356, Cl. 514-456.000.

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Miyauchi, Yuh: *See—*
Kawaki, Takao; Kijima, Yasuhiko; Miyauchi, Yuh; Ukita, Eizi; Nakajima, Toru; and Masumoto, Mituhiko, 4,888,401, Cl. 525-468.000.

Miyazaki, Kunio, to Honda Giken Kogyo Kabushiki Kaisha. Power transmission assembly of belt-type. 4,887,488, Cl. 74-689.000.

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Ono, Mitsuaki; Ueda, Masataka; and Miyazaki, Osamu, 4,888,658, Cl. 360-126.000.

Mizoguchi, Yoshiyuki: *See—*
Watanabe, Yoshitaka; Mizoguchi, Yoshiyuki; and Hiraga, Hiroyuki, 4,888,602, Cl. 346-134.000.

Mizota, Masahiro: *See—*
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,888,332, Cl. 514-206.000.

Mizuguchi, Ryuzo: *See—*
Ohsugi, Hiroharu; Eguchi, Yoshio; Urano, Satoshi; Mizuguchi, Ryuzo; and Takarada, Mitsuhiro, 4,888,406, Cl. 528-32.000.

Mizumoto, Kousei: *See—*
Enokimoto, Akito; Hosoya, Eiji; Kasa, Keiji; Handa, Akio; Ishiwatari, Makoto; and Mizumoto, Kousei, 4,887,844, Cl. 280-779.000.

Mizuno, Genji: *See—*
Nishii, Michiharu; Mizuno, Genji; Tada, Yoshihiko; Nomura, Yoshihisa; Kato, Masahiko; Shirai, Kenji; and Tanoue, Junichi, 4,887,869, Cl. 303-114.000.

Mizusawa, Yoshinori: *See—*
Ichimura, Yoshiaki; Takegawa, Katumi; Mizusawa, Yoshinori; Komoto, Mitsuo; and Umesato, Shoji, 4,887,974, Cl. 439-259.000.

Mobay Corporation: *See—*
Dunlap, Kenneth L.; Markusch, Peter H.; and Ferrell, Clarence D., 4,888,442, Cl. 560-352.000.

Mobil Oil Corporation: *See—*
Allen, Luanne M.; Hagerty, Robert O.; and Mohring, Richard O., 4,888,318, Cl. 502-105.000.
Balloni, Ricardo; Keung, Jay K.; and Mount, Eldridge M., III, 4,888,237, Cl. 428-347.000.
Frisco, Frank D.; Kadash, Raymond J.; and Silverman, Keith B., 4,887,903, Cl. 356-372.000.
Huss, Albin, Jr.; Krishnamurthy, Sowmithri; and McHale, William D., 4,888,105, Cl. 208-137.000.
Min, Taeik, 4,888,395, Cl. 525-301.000.

Mobilio, Dominick, to American Home Products Corporation. Process for the preparation of substituted fused tetrahydrocarbazole acetic acid derivatives. 4,888,431, Cl. 548-420.000.

Mobley, Joseph G.; Kozushin, Anatoly; Baher, Saeed; Addison, Steve; Paulk, Howard; and Farmer, James, to Scientific Atlanta, Inc. Scrambling of signals by inversion. 4,888,799, Cl. 380-6.000.

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Moch, John E.; and Jones, Ronald L. Under dash cover. 4,887,861, Cl. 296-70.000.

Mochida, Ei: *See—*
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,888,332, Cl. 514-206.000.

Mochida, Naoki; and Sawada, Hiroaki, to Mitsubishi Rayon Co., Ltd.; and Mitsubishi Acetate Co., Ltd. Process for production of cellulose acetate molding materials. 4,888,147, Cl. 264-207.000.

Mochida Pharmaceutical Co., Ltd.: *See—*
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,888,332, Cl. 514-206.000.

Mochizuki, Kiyofumi: *See—*
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Mochizuki, Tatsuya: *See—*
Enomoto, Toshihiko; Nakashima, Yasuo; Watanabe, Takashi; Komai, Takao; and Mochizuki, Tatsuya, 4,887,436, Cl. 62-155.000.

Moerman, Paul G. Temporary electrical power pedestal. 4,888,448, Cl. 174-38.000.

Mogas Industries, Inc.: *See—*
Oliver, John P.; and Bright, Thomas F., 4,887,794, Cl. 251-315.000.

Mogle, Rodman A.: *See—*
Zweben, Carl H.; Mogle, Rodman A.; Rodini, Benjamin T., Jr.; and Thaw, Charles L., 4,888,247, Cl. 428-105.000.

Mohl, Werner; and Tolkoff, Marc J., to Boston Scientific Corporation. Method and apparatus for estimating tissue damage. 4,887,608, Cl. 128-673.000.

Mohrbacher, Richard J.; and Grous, Philip P., to McNeilab, Inc. 3-alkoxy-2-aminopropyl heterocyclic amines and their use as cardiovascular agents. 4,888,335, Cl. 514-217.000.

Mohring, Richard O.: *See—*
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Monell Chemical Senses Center: *See—*
Mason, James R.; and Adams, Michael A., 4,888,173, Cl. 424-195.100.

Montani, Enrico: *See—*
Pedretti, Ugo; Bonfanti, Cesarina; Montani, Enrico; Hakemi, Hassan A.; and Roggero, Arnaldo, 4,888,409, Cl. 528-129.000.

Montgomery, Darryl R.; and Raber, David C. Mobile asphalt crack sealant apparatus. 4,887,908, Cl. 366-149.000.

Moore, Danny R.: *See—*
Dean, Walter L.; Moore, Danny R.; Owens, James W.; Schoggen, Howard L.; Bourbon, Robert M.; and Cook, Jeffrey T., 4,888,093, Cl. 162-157.600.

Moore, Edward P., Jr., to Himont Incorporated. Polypropylene composition resistant to high energy radiation, and radiation sterilized articles therefrom. 4,888,369, Cl. 524-100.000.

Moore, Eugene A.; and Lutz, Elmer B., to Honeywell Inc. Overriding clutch. 4,887,703, Cl. 192-45.000.

Moormann, Randall H., to Tonka Corporation. Basketball hoop system. 4,887,812, Cl. 273-1.50R.

Morandini, Rose P. Hood-type garment. 4,887,316, Cl. 2-174.000.

Morawetz, Peter L.; and Ioffe, Zosim, to Empi, Inc. Medical stimulator with stimulation signal characteristics modulated as a function of stimulation signal frequency. 4,887,603, Cl. 128-422.000.

Morgan, Charles R. Apparatus for applying sprout inhibitor to stored potatoes. 4,887,525, Cl. 99-476.000.

Mori, Hideki: *See—*
Ueda, Minoru; Matsuda, Hideaki; and Mori, Hideki, 4,888,403, Cl. 527-103.000.

Mori, Kinji: *See—*
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,888,683, Cl. 364-200.000.

Mori, Nobuyuki: *See—*
Sugimoto, Noritsugu; Mori, Nobuyuki; Nakamura, Shozi; and Wada, Fusazo, 4,888,223, Cl. 428-34.900.

Mori, Shunji: *See—*
Baba, Kenji; Yahagi, Hayao; Watanabe, Shoji; Hara, Naoki; Yoda, Mikio; Mori, Shunji; Iida, Takashi; Katori, Takashi; and Ishida, Masahiko, 4,888,703, Cl. 364-496.000.

Mori, Yoji: *See—*
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,887,522, Cl. 98-40.200.

Mori, Yoshifumi: *See—*
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Morikawa, Kunihiko: *See—*
Sugimoto, Masaki; Hitomi, Nobuteru; Ikeura, Kenji; Hirano, Hiroyuki; Morikawa, Kunihiko; Kitahara, Hisashi; and Takatori, Kazuhiro, 4,887,461, Cl. 73-118.100.

Morin, John M., Jr.: *See—*
Hertel, Larry W.; Morin, John M., Jr.; and Vasileff, Robert T., 4,888,100, Cl. 204-157.700.

Morinaga Milk Industry Co., Ltd.: *See—*
Okonogi, Shigeo; Tomita, Mamoru; Shimamura, Seiichi; Ishibashi, Norio; and Kudo, Tsutomu, 4,888,171, Cl. 424-93.000.

Morinaga, Shigeki; and Watabe, Mitsuru, to Hitachi, Ltd. Data conflict prevention for processor with input/output device. 4,888,685, Cl. 364-200.000.

Morinaga, Shigeki: *See—*
Kondoh, Eiki; Morinaga, Shigeki; Yaginuma, Takao; and Asai, Takeshi, 4,888,721, Cl. 364-736.000.

Morita, Hiroshi: *See—*
Yoshino, Thunekazu; Morita, Hiroshi; Nakano, Hirotaka; Hayashi, Nobuo; and Kubota, Yuko, 4,887,760, Cl. 228-56.300.

Morita, Kouichi: *See—*
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Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,888,045, Cl. 71-90.000.
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Morita, Shigeru: *See*—
Takei, Terutaka; Morita, Shigeru; and Kawakita, Hiroaki, 4,887,686, Cl. 180-211.000.
Moritz, Andrew J. Crab trap. 4,887,382, Cl. 43-102.000.
Moriwaki, Kazuyuki: *See*—
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Morris, John L., to Bass Pro Shops, Inc. Shad type fish bait with nose cavity. 4,887,377, Cl. 43-42.240.
Morse Controls Limited: *See*—
Crack, David J., 4,887,481, Cl. 74-500.500.
Moseley, Elmer L.: *See*—
Flyer, Eric G.; Krusing, Richard A.; and Moseley, Elmer L., 4,887,470, Cl. 73-862.680.
Moseley, Mark S.: *See*—
Halliburton, Harold H.; and Moseley, Mark S., 4,887,898, Cl. 353-28.000.
Moser, Richard J.: *See*—
Parrent, Kenneth G., 4,887,799, Cl. 266-168.000.
Moslehi, Mehrdad M.; and Saraswat, Krishna C., to Leland Stanford Junior University, The Board of Trustees of the. Planarized multilevel interconnection for integrated circuits. 4,888,087, Cl. 156-643.000.
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Geidel, Helmut; and Rohra, Alois, 4,887,424, Cl. 60-39.080.
Motorola, Inc.: *See*—
Chanroo, Keith A.; and Steel, Francis R., deceased, 4,888,793, Cl. 375-84.000.
Foster, Robert I.; Pfeifer, Robert F.; and Mihm, Thomas J., Jr., 4,888,801, Cl. 380-21.000.
Hartvigsen, Jay A.; and Moyer, William C., 4,888,688, Cl. 364-200.000.
Patel, Bakulesh B., 4,887,690, Cl. 181-150.000.
Terry, Brian K.; Hall, Steven D.; and McDermott, Robert J., 4,888,544, Cl. 320-37.000.
Mount, Eldridge M., III: *See*—
Balloni, Ricardo; Keung, Jay K.; and Mount, Eldridge M., III, 4,888,237, Cl. 428-347.000.
Mousseaux, Daniel; Chevet, Bruno; and Grard, Emmanuel, to Societe Anonyme dite : Alcatel Cit. Alignment method, in particular for optical components. 4,887,882, Cl. 350-96.200.
Moy, Christian: *See*—
Berger, Erwin; and Moy, Christian, 4,887,807, Cl. 271-171.000.
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Hartvigsen, Jay A.; and Moyer, William C., 4,888,688, Cl. 364-200.000.
Muchowski, Joseph M.: *See*—
Huguet, Joan; Muchowski, Joseph M.; and Lara, Maria T., 4,888,358, Cl. 514-530.000.
Mueller, Heinz; Herold, Claus-Peter; van Tapavizca, Stephan; Dolhaine, Hans; von Rybinski, Wolfgang; and Wichelhaus, Winfried, to Henkel Kommanditgesellschaft auf Aktien. Water-based drilling and well-servicing fluids with swellable, synthetic layer silicates. 4,888,120, Cl. 252-8.551.
Mueller, Ruediger, to Siemens Aktiengesellschaft. Optoelectronic coupling element, and method of making same. 4,888,625, Cl. 357-17.000.
Mullen, Patrick W.; and Nobile, Frederick E., to Linear Optics Company, Inc. Light modulating material and method for preparing same. 4,888,126, Cl. 252-299.500.
Mullenmeister, Thomas, to Gerhard Rosorius. Thermally readable encoding and activation thereof. 4,888,475, Cl. 235-487.000.
Muller, Friedemann: *See*—
Freitag, Dieter; Joswig, Thomas; Idel, Karsten; Fullmann, Heinz-Josef; and Muller, Friedemann, 4,888,370, Cl. 524-100.000.
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Muller, George H. Powered rotary scalpel structure. 4,887,599, Cl. 606-180.000.
Mumford, Stephen E.; and Smed, Jan P., to Westinghouse Electric Corp. Gas turbine combustion chamber with air scoops. 4,887,432, Cl. 60-759.000.
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Murakami, Manabu: *See*—
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Murakami, Toshiaki; and Moriwaki, Kazuyuki, to Nippon Telegraph and Telephone Corporation. Method of manufacturing thin compound oxide film and apparatus for manufacturing thin oxide film. 4,888,202, Cl. 427-42.000.
Murakami, Tsutomu: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,888,062, Cl. 136-258.000.
Murakami, Yoshihiro, to Yazaki Corporation. Interlock device for connector-junction block assembly. 4,887,978, Cl. 439-553.000.
Muranaka, Akinori, to Star Seimitsu Kabushiki Kaisha. Driving method of a stepping motor. 4,888,542, Cl. 318-696.000.
Murata Manufacturing Co., Ltd.: *See*—
Kawaguchi, Masahiko, 4,888,568, Cl. 333-174.000.
Murata, Shigemi: *See*—
Kodama, Seiki; and Murata, Shigemi, 4,887,572, Cl. 123-414.000.
Murdock, Keith C.; and Durr, Frederick E., to American Cyanamid Company. Novel 1,4-bis(substituted-amino(-5,8-dihydroxyanthraquinones and leuco bases thereof. 4,888,137, Cl. 552-248.000.
Murib, Jawad H.; and Kahn, John H., to National Distillers and Chemical Corporation. Process for the production of pimelic acid. 4,888,443, Cl. 562-517.000.
Murphy, James C.: *See*—
Wacker, Robert L.; Shuster, Donald E.; Sharpless, John; Knobbe, Alan J.; and Murphy, James C., 4,887,770, Cl. 239-703.000.
Murphy, Shirley G.: *See*—
Murphy, Willard J.; and Murphy, Shirley G., 4,887,523, Cl. 99-419.000.
Murphy, Willard J.; and Murphy, Shirley G. Shish-kakob cooking device. 4,887,523, Cl. 99-419.000.
Murray, John E.: *See*—
Fossum, Tryggve; Hetherington, Ricky C.; Fite, David B., Jr.; Manley, Dwight P.; McKeen, Francis X.; and Murray, John E., 4,888,679, Cl. 364-200.000.
Musetti, Louis J. Retractable leash. 4,887,551, Cl. 119-109.000.
Myers, James W., Jr.: *See*—
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Nabisco Brands, Inc.: *See*—
Given, Peter S., Jr.; and Arciszewski, Henry, 4,888,187, Cl. 426-102.000.
Huhn, Stephen D.; Given, Peter S., Jr.; and Klemann, Lawrence P., 4,888,195, Cl. 426-601.000.
Ramnarine, Wayne D., 4,888,192, Cl. 426-448.000.
Nadzan III, Andrew: *See*—
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Nagai, Yoshihiro, to Tokyo Nagai Co., Ltd. Label for food-containing can or the like. 4,887,845, Cl. 283-81.000.
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Nagashima, Takeo: *See*—
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Yamazaki, Shunpei; Suzuki, Kunio; Nagayama, Susumu; Inujima, Takashi; Abe, Masayoshi; Fukada, Takeshi; Kinka, Mikio; Kobayashi, Ippei; Shibata, Katsuhiko; Susukida, Masato; and Koyanagi, Kaoru, 4,888,305, Cl. 437-101.000.
Naito, Genpei, to Nissan Motor Co., Ltd. Driving force distribution control system for 4WD vehicle. 4,887,689, Cl. 180-233.000.
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Najm, Elie M.: *See*—
Celenza, Nicholas; and Najm, Elie M., 4,888,545, Cl. 323-258.000.
Naka, Ichiro: *See*—
Shiraishi, Yoichi; Sakemi, Junya; Ono, Kunio; and Naka, Ichiro, 4,888,299, Cl. 437-51.000.
Nakada, Akihisa, to Woo, Park H. Personal memento including a milk tooth of a child. 4,888,251, Cl. 428-542.400.
Nakada, Toshio; Takemura, Fumio; and Ishiwata, Masao, to Tokai Carbon Co., Ltd. Carbonaceous granular heat insulator and process for preparing the same. 4,888,215, Cl. 427-215.000.
Nakagawa, Kaoru; Yamamoto, Yoshio; and Matsuoka, Nobutaka, to Kabushiki Kaisha Toshiba. Method of manufacturing an soi-type semiconductor device. 4,888,304, Cl. 437-86.000.
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, to Canon Kabushiki Kaisha. Pin junction photovoltaic element having I-type semiconductor layer comprising non-single crystal material containing at least Zn, Se and H in an amount of 1 to 4 atomic %. 4,888,062, Cl. 136-258.000.
Nakahara, Toshiaki: *See*—
Matsumoto, Toru; Koshio, Toshiyuki; Goseki, Yasuhide; Ushiyama, Hisayuki; Yamazaki, Masuo; Ohsaki, Ichiro; Nakahara, Toshiaki; Kurimoto, Junichi; and Wakamiya, Katsutoshi, 4,888,264, Cl. 430-137.000.
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Nakajima, Toru: *See*—
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Nakamura, Yozo: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,887,769, Cl. 239-493.000.
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Nakashima, Yasuo: *See*—
Enomoto, Toshihiko; Nakashima, Yasuo; Watanabe, Takashi; Komai, Takao; and Mochizuki, Tatsuya, 4,887,436, Cl. 62-155.000.
Nakatani, Eisaku: *See*—
Masubuchi, Yoichi; Watanabe, Tadashi; Tominaga, Akira; Nagaoka, Haruo; Nakatani, Eisaku; and Kume, Masafumi, 4,888,244, Cl. 428-416.000.
Nakatani, Kensuke: *See*—
Kambayashi, Makoto; Nakatani, Kensuke; Ozaki, Kazuaki; Tomida, Masahito; Haraguchi, Hiroshi; and Hamamatsu, Takeo, 4,887,349, Cl. 29-623.500.
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Ichikawa, Haruo; Kanno, Ryoichi; and Nakatsukasa, Masato, 4,887,529, Cl. 101-181.000.
Nakazato, Hiroshi; Matsumura, Takashi; Akamatsu, Takahiro; and Fukui, Kenji, to Canon Kabushiki Kaisha. Device for positioning a semi-conductor wafer. 4,887,904, Cl. 356-375.000.
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Fujiwara, Yasuhiko; Abe, Toshiro; Hashimoto, Atsunori; Nakazawa, Shinsuke; Nagano, Masami; and Atago, Takeshi, 4,887,573, Cl. 123-422.000.
Nalco Chemical Company: *See*—
Huang, Shu-Jen W.; and Scheimann, David W., 4,888,386, Cl. 525-57.000.
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Omura, Etsuji; Goto, Katsuhiko; Takahashi, Shogo; Namba, Harumi; and Takemoto, Akira, 4,888,781, Cl. 372-46.000.
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Nankivil, Donald B., to Ford Aerospace Corporation. Range measurement for active optical recognition devices. 4,888,477, Cl. 250-201.000.
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Riley, Robert E.; and Naravan, Thirumurti, 4,888,365, Cl. 521-157.000.
Nathan, Ranga: *See*—
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National Distillers and Chemical Corporation: *See*—
Murib, Jawad H.; and Kahn, John H., 4,888,443, Cl. 562-517.000.
National Semiconductor Corporation: *See*—
Edler, Peter A., 4,888,562, Cl. 330-291.000.
Skovmand, Timothy J., 4,888,505, Cl. 307-571.000.
Wong, Hee; and Guinea, Jesus, 4,888,790, Cl. 375-20.000.
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Chiao, Wen B.; Iovine, Carmine P.; and Gold, Samuel, 4,888,250, Cl. 428-514.000.
Nauta, Adriaen E. R. Self-locking transport strap. 4,887,752, Cl. 224-202.000.
NCR Corporation: *See*—
Cooney, Henry G., 4,888,802, Cl. 380-49.000.
Kallin, Fredrik L. N.; and Reid, Bruce A., 4,888,481, Cl. 250-231.0SE.
Sanwo, Ikuo J.; and Milby, Gregory H., 4,888,499, Cl. 307-471.000.
Sanwo, Ikuo J.; Simeral, John D.; and Daniel, Richard A., 4,888,501, Cl. 307-475.000.
NEC Corporation: *See*—
Ando, Fumio; Ichinokawa, Kazuo; and Yokoyama, Takayuki, 4,888,795, Cl. 379-53.000.
Arai, Masanobu, 4,888,762, Cl. 370-32.100.
Furuya, Yukitsuna; and Akashi, Fumio, 4,888,767, Cl. 370-95.200.
Ichimura, Yoshiaki; Takegawa, Katumi; Mizusawa, Yoshinori; Komoto, Mitsuo; and Umesato, Shoji, 4,887,974, Cl. 439-259.000.
Itoh, Masataka, 4,888,755, Cl. 369-45.000.
Kuraishi, Yoshiaki, 4,888,587, Cl. 341-122.000.
Tanigawa, Takaho, 4,888,772, Cl. 371-21.200.
Umeda, Tetsuo; and Sugiura, Fumihiko, 4,888,646, Cl. 358-464.000.
Nederlanden Vertegenwoordigd: *See*—
Van Wezel, Antonius L., deceased; De Haan, Hans H.; and Vermeij, Stephan, 4,888,294, Cl. 435-316.000.
Neely, James W., to Rohm and Haas Company. Catalytic process and systems. 4,888,209, Cl. 427-97.000.
NEFF Gewindespindeln GmbH: *See*—
Hauser, Karl-Heinz; Heissel, Uwe; Inauen, Walter; Neff, Karl; and Ringger, Manfred, 4,887,477, Cl. 74-89.170.
Neff, Karl: *See*—
Hauser, Karl-Heinz; Heissel, Uwe; Inauen, Walter; Neff, Karl; and Ringger, Manfred, 4,887,477, Cl. 74-89.170.
Neh, Harribert; Buhmann, Ulrich; Wegner, Peter; Joppien, Hartmut; Giles, David; and Rowson, Graham P., to Schering Aktiengesellschaft. Insecticides pyrazolines, compositions and use. 4,888,340, Cl. 514-403.000.
Nehrbauer, Joseph A., to Westinghouse Electric Corp. Heat exchanger system having adjustable heat transfer capacity. 4,887,664, Cl. 165-76.000.
Nelson, Blaine J., to Rockwell International Corporation. Digitally controlled oscillator apparatus. 4,888,729, Cl. 364-900.000.
Nelson, Dwight C., to Season-all Industries, Inc. Alignment clip member for windows and associated method. 4,887,407, Cl. 52-745.000.
Nelson Industries, Inc.: *See*—
Khosropour, Mostafa M., 4,887,460, Cl. 73-118.100.
Nemeth, Joseph; and Kowalski, Charles I., to Champion Spark Plug Company. Open-celled, electrically conductive ceramic network. 4,887,795, Cl. 252-511.000.
Nemic Lambda Co., Ltd.: *See*—
Hiramatsu, Rihei; Imano, Seiji; Watanabe, Kazushi; and Takeishi, Shinzo, 4,888,672, Cl. 363-49.000.
Neos Products HB, Karlsson, Neuman, Tamm: *See*—
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Neri, Carlo: *See*—
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Nestec S.A.: *See*—
Carlson, Thommy, 4,888,133, Cl. 252-400.610.
Neubauer, Steven P.: *See*—
Dickovich, Thomas E.; and Neubauer, Steven P., 4,887,534, Cl. 102-373.000.
Neuman, Karl E., to Neos Products HB, Karlsson, Neuman, Tamm. Multiple-step gear drive. 4,887,478, Cl. 74-354.000.
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Chiles III, Robert E.; Neville, Bruce R.; Wattis, Richard D.; and Werthmann, Scott, 4,887,813, Cl. 273-54.00C.
New Brunswick Telephone Company, Limited, The: *See*—
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Newell Manufacturing Company: *See*—
Haltof, Garry P., 4,887,389, Cl. 49-181.000.
Newman, Neil A.; and Bankstahl, Herbert A., to Brunswick Corporation. Gear driven marine propulsion system with steerable gearcase and dual counterrotating propellers. 4,887,982, Cl. 440-81.000.
Newman, Neil A., to Brunswick Corporation. Marine transmission with fluid coupler. 4,887,984, Cl. 440-86.000.
Newman, Neil A.: *See*—
Bankstahl, Herbert A.; and Newman, Neil A., 4,887,983, Cl. 440-57.000.
Ngai, Chuck H.; Wassel, Edward R.; and Watkins, Gerald J., to International Business Machines Corp. Parallel vector processor using multiple dedicated processors and vector registers divided into smaller registers. 4,888,682, Cl. 364-200.000.
NGK Insulators, Ltd.: *See*—
Hayakawa, Isse, 4,887,518, Cl. 92-212.000.
Watanabe, Keiichiro; and Ohashi, Tsuneaki, 4,888,312, Cl. 501-102.000.
NGK Spark Plug Co., Ltd.: *See*—
Matsuura, Tooru; and Taniguchi, Masato, 4,887,568, Cl. 123-270.000.
Nguyen, Dat T.; Veinot, Dwight E.; and Foster, James, to Her Majesty the Queen as represented by the Minister of National Defence of Her Majesty's Canadian Government. Inorganic intumescent fire protective coatings. 4,888,057, Cl. 106-18.120.
Nguyen, Tuan A., to Allergan, Inc. Endocapsular intraocular lens. 4,888,014, Cl. 623-6.000.
Nguyen, Van-Duc, to General Electric Company. Image interpretation method and apparatus using faces for constraint satisfaction. 4,888,711, Cl. 364-522.000.
Nicaise, Maryvonne: *See*—
Gauneus, Gilbert; Nicaise, Maryvonne; and Tran, Kifu O., 4,888,019, Cl. 623-18.000.
Nicholson, Dean B.; and Matreci, Robert J., to Hewlett-Packard Company. Magnetically tuneable millimeter wave bandpass filter having high off resonance isolation. 4,888,569, Cl. 333-209.000.
Nickerson, Jeffrey A. Compressible foam insert for building blocks. 4,887,405, Cl. 52-309.120.
Nicollini, Germano; and Confalonieri, Pierangelo, to SGS Thomson Microelectronics spa. TTL-compatible cell for CMOS integrated circuits. 4,888,500, Cl. 307-475.000.
Niedospial, John J., Jr.; and Bush, Bradley S., to Eastman Kodak Company. Film cassette. 4,887,776, Cl. 242-71.100.
Niekamp, Carl W.; and Seidman, Martin, to A. E. Staley Manufacturing Company. Enrichment of fructose syrups. 4,888,060, Cl. 127-60.000.

Nielsen, Runo R.: *See*—
Madsen, Knud E.; and Nielsen, Runo R., 4,888,529, Cl. 315-370.000.
Nihon Medi-Physics Co., Ltd.: *See*—
Kubodera, Akiko; Tanaka, Touichi; and Komori, Yukimichi, 4,888,163, Cl. 424-1.100.
Nikken Chemicals Company, Limited: *See*—
Kondou, Tsutomu, 4,888,183, Cl. 426-34.000.
Nilssen, Ole K. Sun tanning apparatus having electronic operating system. 4,888,525, Cl. 315-212.000.
Nilssen, Ole K. Operating system for sun tanning apparatus. 4,888,526, Cl. 315-324.000.
Nippon Chemi-Con Corporation: *See*—
Naitoh, Kazumi; and Arakawa, Yoshiaki, 4,888,666, Cl. 361-512.000.
Nippon Electric Glass Company, Limited: *See*—
Saji, Kosaburo; Yamamoto, Shigeru; and Imai, Katsuhiko, 4,887,404, Cl. 52-306.000.
Nippon Hoso Kyokai: *See*—
Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Hotta, Hirohisa; Ono, Yotaro; and Matsuura, Masahiro, 4,887,800, Cl. 266-270.000.
Nippon Oil and Fats Co., Ltd.: *See*—
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Nippon Paint Co., Ltd.: *See*—
Ohsugi, Hiroharu; Eguchi, Yoshio; Urano, Satoshi; Mizuguchi, Ryuzo; and Takarada, Mitsuhiro, 4,888,406, Cl. 528-32.000.
Nippon Soken, Inc.: *See*—
Igashira, Toshihiko; Sakakibara, Yasuyuki; Abe, Seiko; Sekiguchi, Kiyonori; Izawa, Akihiro; and Kawai, Hisasi, 4,887,569, Cl. 123-300.000.
Nippon Steel Corporation: *See*—
Yoshitomi, Yasunari; Iwayama, Kenzo; Nagashima, Takeo; and Yakashiro, Kenichi, 4,888,066, Cl. 148-113.000.
Nippon Telegraph and Telephone Corporation: *See*—
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Nippon Thompson Co., Ltd.: *See*—
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Nishi, Masaya: *See*—
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Nishida, Toshio: *See*—
Shirakawa, Masakazu; Yamashita, Hiroaki; and Nishida, Toshio, 4,888,728, Cl. 364-900.000.
Nishii, Michiharu; Mizuno, Genji; Tada, Yoshihiko; Nomura, Yoshihisa; Kato, Masahiko; Shirai, Kenji; and Tanoue, Junichi, to Aisin Seiki Kabushiki Kaisha. Hydraulic braking system. 4,887,869, Cl. 303-114.000.
Nishimura, Akihiro: *See*—
Suzuki, Yasunobu; Kato, Motohiko; Bando, Akio; Ishida, Hisao; and Nishimura, Akihiro, 4,887,758, Cl. 228-5.100.
Nishimura, Kazuhiko: *See*—
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Nishimura, Yuusaku; Ishida, Masahiko; and Haga, Ryoichi, to Hitachi, Ltd. Enzyme immobilization on a water-insoluble amino group-containing carrier. 4,888,285, Cl. 435-176.000.
Nishino, Toshikazu: *See*—
Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, 4,888,629, Cl. 357-5.000.
Nissan Motor Company, Limited: *See*—
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,888,696, Cl. 364-424.050.
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Naito, Genpei, 4,887,689, Cl. 180-233.000.
Shinzawa, Motohiro; and Kanesaki, Nobukazu, 4,887,427, Cl. 60-286.000.
Takahashi, Hiroshi, 4,887,575, Cl. 123-435.000.
Yoshimoto, Yoshiaki, 4,887,839, Cl. 280-690.000.
Nissan Motor Co., Ltd: *See*—
Sugimoto, Masaki; Hitomi, Nobuteru; Ikeura, Kenji; Hirano, Hiroyuki; Morikawa, Kunihiko; Kitahara, Hisashi; and Takatori, Kazuhiro, 4,887,461, Cl. 73-118.100.
Nissin Kogyo Kabushiki Kaisha: *See*—
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Nitta, Tsuneo; Uehara, Kensuke; and Watanabe, Sadakazu, to Kabushiki Kaisha Toshiba. System for continuous speech recognition through transition networks. 4,888,823, Cl. 381-43.000.
Nitz, Rolf-Eberhard: *See*—
Bohn, Helmut; Just, Melitta; and Nitz, Rolf-Eberhard, 4,888,333, Cl. 514-212.000.
Niwa, Yukichi: *See*—
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Nixdorf, Richard D.; and Rawlins, Mary H., to American Matrix, Inc. Method for the preparation of titanium nitride whiskers. 4,888,084, Cl. 156-600.000.
NK Innovations, Inc.: *See*—
Kayali, Nabil A., 4,887,784, Cl. 248-311.200.
Nobile, Frederick E.: *See*—
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Noda, Susumu: *See*—
Kojima, Keisuke; Kyuma, Kazuo; Noda, Susumu; Kameya, Masaaki; Ohta, Jun; and Hammanaka, Koichi, 4,888,783, Cl. 372-44.000.
Nogami, Toyoichiro: *See*—
Sukimoto, Minobu; Yamazaki, Katsumi; Hirunuma, Naohisa; Taguchi, Seijiro; Usui, Tadashi; Akiyoshi, Yasushi; Nogami, Toyoichiro; and Kaneko, Toyoji, 4,887,557, Cl. 123-52.0MC.
Nogi, Toshiharu: *See*—
Kuroiwa, Hiroshi; Oyama, Yoshishige; and Nogi, Toshiharu, 4,887,574, Cl. 123-425.000.
Noguchi, Tetsuo: *See*—
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Noiles, Douglas G.: *See*—
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Noll, Tobias: *See*—
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Nollen, Dennis A.; and Quinn, Arthur A., to Du Pont de Nemours, E. I., and Company. Low density nonwoven aramid sheets. 4,888,091, Cl. 162-109.000.
Noma Video Inc.: *See*—
Freed, Mark L., 4,887,506, Cl. 84-727.000.
Nomura, Masayoshi: *See*—
Hashimoto, Masashi; and Nomura, Masayoshi, 4,888,736, Cl. 365-189.010.
Nomura, Yoshihiro: *See*—
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Nonaka, Yasuhiko: *See*—
Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.
Norden Laboratories, Inc.: *See*—
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Nordson Corporation: *See*—
Burke, Richard D., 4,887,363, Cl. 34-57.00A.
Fetcenko, Raymond M.; Wydro, Jan; and Zuponcic, Ralph P., 4,888,082, Cl. 156-500.000.
Wacker, Robert L.; Shuster, Donald E.; Sharpless, John; Knobbe, Alan J.; and Murphy, James C., 4,887,770, Cl. 239-703.000.
Norefors, Ulf-Goran: *See*—
Brantmark, Håkan; Lindqvist, åke; and Norefors, Ulf-Goran, 4,888,708, Cl. 364-513.000.
Norstrom, Svenn A.: *See*—
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North American Philips Corporation: *See*—
Jacoba, Leon D., 4,887,979, Cl. 439-578.000.
Ramesh, Subramanian, 4,888,302, Cl. 437-82.000.
Northern Telecom Limited: *See*—
McLean, Kenneth W.; Kuhfus, Gerd; and Walker, Charles R. S., 4,887,972, Cl. 439-137.000.
Nose, Hiroyasu, to Canon Kabushiki Kaisha. Objective lens driving device. 4,887,888. Cl. 350-247.000.
Nose, Noriyuki; and Niwa, Yukichi, to Canon Kabushiki Kaisha. Eye examining apparatus. 4,887,897, Cl. 351-233.000.
Novosel, David: *See*—
Dallabora, Marco; Gastaldi, Roberto; and Novosel, David, 4,888,497, Cl. 307-272.300.
Nozaka, Kenkichi; Kawahara, Yoshihiro; Fukutaka, Takashi; and Horie, Fumiharu, to Kubota Ltd. Device for connecting work machine to tractor. 4,887,680, Cl. 180-53.300.
Nu-C Products Inc.: *See*—
Gray, Robert D.; and Gray, Thomas J., 4,888,181, Cl. 426-643.000.
Nudvuck Enterprises: *See*—
Kugelmann, Franz J., 4,888,073, Cl. 156-197.000.
Nunally, Patrick O., to General Dynamics Corp., Pomona Div. Vacuum weli process. 4,887,544, Cl. 118-50.000.
Nutt, David H. Method and apparatus for cutting taps in sewer lines. 4,887,585, Cl. 125-14.000.
Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., to Raychem Corporation. Method and articles employing ion exchange material. 4,888,098, Cl. 204-1.00R.
Nylok Fastener Corporation: *See*—
Duffy, Richard J.; DiMaio, Anthony; and Sessa, Eugene D., 4,888,214, Cl. 427-183.000.
Nyodine Products, Inc.: *See*—
Barnes, Carl E.; and Barnes, Arthur C., 4,888,118, Cl. 210-668.000.
O & S Manufacturing Company: *See*—
Trudeau, William H., 4,888,236, Cl. 428-34.100.

O'Brien, Christine A.: *See—*
O'Brien, Michael; Leishman, Lorie; and O'Brien, Christine A., 4,887,326, Cl. 5-421.000.
O'Brien, Kevin J.: *See—*
George, Paul L.; Waxman, David M.; Sybel, Randall T.; Mednick, Elliot H.; O'Brien, Kevin J.; and Spatara, Joseph M., 4,888,691, Cl. 364-300.000.
O'Brien, Michael; Leishman, Lorie; and O'Brien, Christine A., to Bax Associates. Suboccipital pillow. 4,887,326, Cl. 5-421.000.
Ochi, Hisashi: *See—*
Takami, Tetuji; Tsubota, Hiroyki; and Ochi, Hisashi, 4,888,289, Cl. 435-15.000.
Ochiai, Takashi: *See—*
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O'Connell, David M., to W. R. Grace & Co.-Conn. Method for pleating film. 4,887,993, Cl. 493-439.000.
O'Connor, Lawrence J., to KT Technologies Inc. Pre-packaged pressure sensitive tear tape. 4,887,714, Cl. 206-411.000.
Oda, Kazutaka, to Fuji Photo Film Co., Ltd. Apparatus for continuously drying coating layer on web. 4,887,365, Cl. 34-60.000.
Oda, Omasu; and Amano, Toshio, to Sony Corporation. Television on channel selecting apparatus with sequential selection of auxiliary signal source. 4,888,819, Cl. 358-192.100.
Odetics, Inc.: *See—*
Blum, Victor, 4,888,654, Cl. 360-74.100.
Odorisio, Paul A.; and Pastor, Steven D., to Ciba-Geigy Corporation. 6-(4-Hydroxyphenyl)-4,5-dihydro-3(2h)-pyridazinones and stabilized compositions. 4,888,423, Cl. 544-238.000.
Oertley, Thomas E.: *See—*
Adams, Carl P.; Spivey, William J., Jr.; and Oertley, Thomas E., 4,887,872, Cl. 305-10.000.
Ogasawara, Fumihiro, to Ricoh Company, Ltd. Multi-terminal control system. 4,888,766, Cl. 370-95.100.
Ogata, Kazumi; Ogawa, Takahiro; and Sakaue, Takahiro, to Senju Pharmaceutical Co., Ltd. Antiulcer composition. 4,888,329, Cl. 514-100.000.
Ogawa, Hirofumi: *See—*
Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.
Ogawa, Takahiro: *See—*
Ogata, Kazumi; Ogawa, Takahiro; and Sakaue, Takahiro, 4,888,329, Cl. 514-100.000.
Oguma, Reiji: *See—*
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Ogura Art Printing Co., Ltd.: *See—*
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Ogura, Yoichi, to Kabushiki Kaisha Toshiba. Gain-variable amplifier circuit. 4,888,560, Cl. 330-254.000.
Ogura, Yoshiharu, to Ogura Art Printing Co., Ltd. Packaging box having an improper tear prevention structure. 4,887,764, Cl. 229-102.000.
Ohashi, Shigenobu: *See—*
Todoroki, Yasumasa; Miura, Haruo; and Ohashi, Shigenobu, 4,887,940, Cl. 415-199.100.
Ohashi, Takashi: *See—*
Ishiwaka, Takumi; Andoh, Yukio; Yamaguchi, Michiyuki; Suzuki, Shosuke; Egashira, Yoshinori; Yokobori, Takeo; and Ohashi, Takashi, 4,887,923, Cl. 400-659.000.
Ohashi, Tsuneaki: *See—*
Watanabe, Keiichiro; and Ohashi, Tsuneaki, 4,888,312, Cl. 501-102.000.
Ohba, Toshihiro: *See—*
Shoji, Kazuo; Fujioka, Yosihide; Harada, Shigeyuki; and Ohba, Toshihiro, 4,888,523, Cl. 315-169.300.
Ohga, Kunihiko; and Saeki, Keiso, to Fuji Photo Film Co., Ltd. Pressure-sensitive microcapsule sheet. 4,888,334, Cl. 503-214.000.
Ohio Art Company, The: *See—*
Wickstead, James C.; and Selden, Gerald P., 4,887,968, Cl. 434-85.000.
Ohio State University Research Foundation, The: *See—*
Busch, Daryle H., 4,888,032, Cl. 55-38.000.
Ohishi, Hirohiko, to Fuji Photo Film Co., Ltd. Method and apparatus for roller leveler. 4,887,343, Cl. 29-445.000.
Ohishi, Hiromi: *See—*
Ihara, Kazunori; Ohishi, Hiromi; and Yatagai, Shoko, 4,888,320, Cl. 502-304.000.
Ohkuma, Nobuyoshi: *See—*
Sakimori, Hideharu; Komatsu, Yoji; Ito, Masahiro; and Ohkuma, Nobuyoshi, 4,887,341, Cl. 29-156.40R.
Ohlenforst, Hans; and Kunert, Heinz, to Saint-Gobain Vitrage. Accessory support device for vehicle windshield and method of installing. 4,888,072, Cl. 156-108.000.
Ohlin, Tommy C. K.: *See—*
Welander, Bo C.; Ohlin, Tommy C. K.; and Jarvis, Ronald P., 4,888,099, Cl. 204-95.000.
Ohlrogge, John B.: *See—*
Beremand, Phillips D.; Ohlrogge, John B.; and Kuhn, David N., 4,888,282, Cl. 435-193.000.
Ohm, Heinz-Friedrich: *See—*
Appel, Hans-Gunter; Ohm, Heinz-Friedrich; Bluhm, Klaus; and Probst, Kurt, 4,888,537, Cl. 318-626.000.
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, to Mochida Pharmaceutical Co., Ltd. Cephalosporin derivatives. 4,888,332, Cl. 514-206.000.
Ohno, Akio, to Canon Kabushiki Kaisha. Multiple image forming apparatus with charger to prevent disturbance of already-transferred images. 4,888,621, Cl. 355-326.000.
Ohsaki, Ichiro: *See—*
Matsumoto, Toru; Koshio, Toshiyuki; Goseki, Yasuhide; Ushiyama, Hisayuki; Yamazaki, Masuo; Ohsaki, Ichiro; Nakahara, Toshiaki; Kurimoto, Junichi; and Wakamiya, Katsutoshi, 4,888,264, Cl. 430-137.000.
Ohsugi, Hiroharu; Eguchi, Yoshio; Urano, Satoshi; Mizuguchi, Ryuzo; and Takarada, Mitsuhiro, to Nippon Paint Co., Ltd. Polymerizable monomer containing silicons and preparation thereof. 4,888,406, Cl. 528-32.000.
Ohta, Jun: *See—*
Kojima, Keisuke; Kyuma, Kazuo; Noda, Susumu; Kameya, Masaaki; Ohta, Jun; and Hammanaka, Koichi, 4,888,783, Cl. 372-44.000.
Ohta, Masakatsu; and Itoi, Masaaki, to Idemitsu Kosan Co., Ltd. Nozzle for melt spinning of pitch and method for spinning pitch. 4,887,957, Cl. 425-72.200.
Ohta, Minemasa: *See—*
Kobayashi, Masaki; and Ohta, Minemasa, 4,888,491, Cl. 250-561.000.
Ohta, Teruo, to Sony Corporation. Disk cartridge. 4,888,761, Cl. 369-291.000.
Ohta, Yoshiji: *See—*
Azuma, Daisuke; Ohta, Yoshiji; and Tanaka, Shinichi, 4,888,631, Cl. 357-23.600.
Ohtagaki, Shigeki: *See—*
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; Wada, Shunichi; and Ohtagaki, Shigeki, 4,887,840, Cl. 280-707.000.
Ohtaki, Kazumi: *See—*
Tomita, Masami; Nomura, Yoshihiro; Ide, Noriaki; and Ohtaki, Kazumi, 4,888,263, Cl. 430-106.000.
Ohtsuka, Masaru, to Canon Kabushiki Kaisha. Stage mechanism. 4,887,804, Cl. 269-73.000.
Ohuchi, Kenji: *See—*
Wada, Akihiro; Kakuta, Rin-ichi; Ohuchi, Kenji; Sugiyama, Jun; and Hasegawa, Shinji, 4,888,387, Cl. 525-66.000.
Ohuchi, Osamu: *See—*
Fujino, Hitoshi; Sawada, Takamasa; Kobayashi, Hiroo; Ohuchi, Osamu; Yagi, Tadashi; and Hayakawa, Yasuyoshi, 4,888,620, Cl. 355-211.000.
Oka, Tetsuo; Hayashi, Kenji; Akamatsu, Takayoshi; and Horiuchi, Satoshi, to Toray Industries, Inc. Process for preparation of vertical magnetic recording medium. 4,888,211, Cl. 427-130.000.
Okada, Takashi, to Yamaha Corp. Ski boot made of hard synthetic resin. 4,887,370, Cl. 36-120.000.
Okada, Yosuke, to Sherwood Medical Company. Catheter for nasogastric intubation. 4,887,997, Cl. 604-54.000.
Okamoto, Eisaku; and Abe, Yasunao, to Yamaha Corporation. Automatic accompaniment apparatus realizing automatic accompaniment and manual performance selectable automatically. 4,887,504, Cl. 84-715.000.
Okamoto, Nobukazu: *See—*
Shiozawa, Kouji; Takai, Haruko; Takatsuna, Kazutoshi; Okamoto, Nobukazu; Okumura, Yoshiharu; and Imai, Chihiro, 4,888,436, Cl. 556-413.000.
Okamoto, Shingo, to Kabushiki Kaisha Toshiba. Magnetron. 4,888,520, Cl. 313-292.000.
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, to Hitachi, Ltd. Electromagnetic fuel injection valve. 4,887,769, Cl. 239-493.000.
Okano, Kanemichi: *See—*
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.
Okano, Kazuyuki: *See—*
Isozaki, Yasuhito; Okano, Kazuyuki; and Hasegawa, You, 4,888,210, Cl. 427-126.300.
Okegawa, Tadao: *See—*
Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, 4,888,351, Cl. 514-397.000.
Oketani, Kiyoshi: *See—*
Yamatsu, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Murakami, Manabu; Oketani, Kiyoshi; and Fujisaki, Hideaki, 4,888,439, Cl. 560-129.000.
Okonogi, Shigeo; Tomita, Mamoru; Shimamura, Seiichi; Ishibashi, Norio; and Kudo, Tsutomu, to Morinaga Milk Industry Co., Ltd. Granular product of dried microorganism cells and manufacturing method therefor. 4,888,171, Cl. 424-93.000.
Okuda, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Ignition apparatus for internal combustion engine. 4,887,581, Cl. 123-602.000.
Okumura, Toshiaki, to Grace Create Inc. Midget life-saving respirator gas tank apparatus. 4,887,591, Cl. 128-205.210.
Okumura, Yoshiharu: *See—*
Shiozawa, Kouji; Takai, Haruko; Takatsuna, Kazutoshi; Okamoto, Nobukazu; Okumura, Yoshiharu; and Imai, Chihiro, 4,888,436, Cl. 556-413.000.

Okura Kogyo Kabushiki Kaisha: *See*—
Ueda, Minoru; Matsuda, Hideaki; and Mori, Hideki, 4,888,403, Cl. 527-103.000.
Okuzawa, Tugio, to Fuji Photo Film Co., Ltd. Sheet feeding mechanism for an image recording device. 4,888,617, Cl. 355-203.000.
O'Leary, Audrey A., to Weyerhaeuser Company. Ventilated diaper or incontinent garment. 4,887,602, Cl. 604-305.100.
Olejak, Ingo W. V.: *See*—
Tomlin, Jerry B.; and Olejak, Ingo W. V., 4,887,643, Cl. 137-625.660.
Olin Corporation: *See*—
Crane, Jacob; Johnson, Barry C.; Mahulikar, Deepak; and Butt, Sheldon H., 4,888,449, Cl. 174-52.400.
Oliver, John P.; and Bright, Thomas F., to Mogas Industries, Inc. Ball valve. 4,887,794, Cl. 251-315.000.
Olivo, John W., Jr. Program material screening device. 4,888,796, Cl. 379-101.000.
Olson, Jay H.: *See*—
Cerny, John R., Jr.; Olson, Jay H.; Hall, James W.; and Erdman, Leon P., 4,887,420, Cl. 56-320.200.
Olympous Optical Co., Ltd.: *See*—
Yabe, Hisao; and Takamura, Koji, 4,888,639, Cl. 358-98.000.
Omodei-Sale', Amedeo; Consonni, Pietro; and Galliani, Giulio, to Gruppo Lepetit S.p.A. New acyl-1H-1,2,4-triazole derivatives. 4,888,350, Cl. 514-384.000.
OMS, Inc.: *See*—
Earnest, Lester D., 4,888,798, Cl. 380-4.000.
Omura, Etsuji; Goto, Katsuhiko; Takahashi, Shogo; Namba, Hiromi; and Takemoto, Akira, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser. 4,888,781, Cl. 372-46.000.
Onishi, Akira: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,887,769, Cl. 239-493.000.
Onishi, Masayoshi: *See*—
Hata, Yasuaki; Yasukawa, Takeshi; and Onishi, Masayoshi, 4,888,551, Cl. 324-208.000.
Ono, Hiroshi: *See*—
Matsuda, Minoru; Itoh, Seiki; and Ono, Hiroshi, 4,888,392, Cl. 526-279.000.
Ono, Kunio: *See*—
Shiraishi, Yoichi; Sakemi, Junya; Ono, Kunio; and Naka, Ichiro, 4,888,299, Cl. 437-51.000.
Ono, Mitsuaki; Ueda, Masataka; and Miyazaki, Osamu, to Matsushita Electric Industrial Co., Ltd. Magnetic head for magnetic recording and reproducing unit. 4,888,658, Cl. 360-126.000.
Ono, Mitsunori: *See*—
Itoh, Isamu; Ono, Mitsunori; and Inagaki, Yoshio, 4,888,268, Cl. 430-218.000.
Ono Pharmaceutical Co., Ltd.: *See*—
Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, 4,888,351, Cl. 514-397.000.
Ono, Yotaro: *See*—
Hotta, Hirohisa; Ono, Yotaro; and Matsuura, Masahiro, 4,887,800, Cl. 266-270.000.
Ooms, Pieter: *See*—
Baasner, Bernd; Klausener, Alexander; and Ooms, Pieter, 4,888,430, Cl. 548-247.000.
Ophthalmic Ventures Limited Partnership: *See*—
Richards, William D., 4,887,601, Cl. 606-219.000.
Orange Service Company, Inc.: *See*—
Block, Donald P., 4,887,372, Cl. 37-91.000.
Orban, Andre: *See*—
Tannenbaum, Eli; Burgess, Trevor; Kalessidis, Vassilios; Orban, Andre; Williams, John; and Zanker, Klaus, 4,887,464, Cl. 73-153.000.
Orban, Robert A. Adjustable equalizer for compensating for high frequency rolloff and typical AM receivers. 4,888,789, Cl. 375-12.000.
Orimo, Masayuki: *See*—
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,888,683, Cl. 364-200.000.
Ornholmer, Lars: *See*—
Kolavcic, Pavel; Sobel, Jarl; and Ornholmer, Lars, 4,887,471, Cl. 73-862.690.
Osame, Yasuhiro: *See*—
Sato, Shoichi; Osame, Yasuhiro; and Tazaki, Seiji, 4,888,067, Cl. 148-26.000.
Osawa, Tadao: *See*—
Arai, Nobukatsu; Sekine, Yoshihito; Osawa, Tadao; Tokuda, Hiroatsu; Usui, Toshifumi; and Tsutsui, Mitsukuni, 4,887,577, Cl. 123-494.000.
Oscar Mayer Foods Corporation: *See*—
Anders, Robert J.; Cerveny, John G.; and Milkowski, Andrew L., 4,888,191, Cl. 426-281.000.
Osteonics Corp.: *See*—
Averill, Robert G.; and Cohen, Robert C., 4,888,023, Cl. 623-22.000.
Osterloh, Rolf: *See*—
Blum, Rainer; Belde, Horst; Osterloh, Rolf; and Uhl, Guenter, 4,888,124, Cl. 252-182.200.
Ostrowsky, Efrem M.; and Kinsley, John P., to Seaquist Closures, a division of Pittway Corporation. Two-piece, snap-action closure. 4,887,747, Cl. 222-556.000.
Ota, Kenshiro; and Namiki, Yoshio, to Daicolo Co., Ltd. Photographic apparatus having a self-monitoring device. 4,888,606, Cl. 354-76.000.
Otaki, Michitaka: *See*—
Hirai, Hidefumi; Komiyama, Makoto; and Otaki, Michitaka, 4,888,248, Cl. 438-403.000.
Otsuka, Fumio: *See*—
Hayashi, Mikio; and Otsuka, Fumio, 4,887,921, Cl. 400-196.100.
Outani, Hiroaki; and Inoue, Seiji, to Sanshin Kogyo Kabushiki Kaisha. Noise reducing device for marine propulsion. 4,887,692, Cl. 181-235.000.
Owechko, Yuri: *See*—
Marom, Emanuel; Owechko, Yuri; and Soffer, Bernard H., 4,888,724, Cl. 364-807.000.
Owen, Hartley: *See*—
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,888,103, Cl. 208-73.000.
Owens, James W.: *See*—
Dean, Walter L.; Moore, Danny R.; Owens, James W.; Schoggen, Howard L.; Bourbon, Robert M.; and Cook, Jeffrey T., 4,888,093, Cl. 162-157.600.
Oy Tampella AB: *See*—
Rautakorpi, Paavo, 4,887,362, Cl. 34-41.000.
Oya, Yuichiro, to Sharp Kabushiki Kaisha. Fixing structure for components of a cooking appliance. 4,888,460, Cl. 219-10.55R.
Oyama, Yoshishige: *See*—
Kuroiwa, Hiroshi; Oyama, Yoshishige; and Nogi, Toshiharu, 4,887,574, Cl. 123-425.000.
Oza, Bharat J.: *See*—
Arlington, David L.; Cole, Jacqueline M.; Hazelzet, Bruce G.; Krolak, David J.; Li, Hehching H.; Oza, Bharat J.; and Weaver, A. Frank, 4,888,773, Cl. 371-40.200.
Ozaki, Kazuaki: *See*—
Kambayashi, Makoto; Nakatani, Kensuke; Ozaki, Kazuaki; Tomida, Masahito; Haraguchi, Hiroshi; and Hamamatsu, Takeo, 4,887,349, Cl. 29-623.500.
Ozaki, Yukio: *See*—
Sunagawa, Makoto; Isobe, Yutaka; Takeuchi, Yutaka; Matsumura, Haruki; Ozaki, Yukio; and Noguchi, Tetsuo, 4,888,344, Cl. 514-210.000.
Packwood, Simon W.: *See*—
Cockerham, Kevin; and Packwood, Simon W., 4,887,456, Cl. 73-35.000.
Paik, Woo H.; Fong, William; Goerge, Ashok K.; and McCormick, John E., to General Instrument Corporation. Satellite antenna alignment system. 4,888,592, Cl. 342-359.000.
Pak, Charles Y. C., to University of Texas System, Board of Regents of the. Compositions and methods of treating calcium renal stones. 4,888,182, Cl. 424-677.000.
Paley, Edward: *See*—
Paley, Steven J.; Eberhardt, Clifford A.; and Paley, Edward, 4,888,229, Cl. 428-192.000.
Paley, Steven J.; Eberhardt, Clifford A.; and Paley, Edward, to Texwipe Company, The. Wipers for cleanroom use. 4,888,229, Cl. 428-192.000.
Pallien, Wilhelm, to Alfred Boerner GmbH. Method of manufacturing a double-edged peeling knife. 4,887,495, Cl. 76-104.00R.
Palmer, David G.; Shannon, David J.; and Vacha, Keith L., to Pure Water, Inc. Water purification method and apparatus. 4,888,097, Cl. 203-1.000.
Palmer, John L.; and Anilionis, Algis, to Repligen Corporation. Hybrid proteins produced by an ultrahigh prokaryotic expression. 4,888,280, Cl. 435-69.700.
Pankratz, Richard P., to Du Pont de Nemours, E. I., and Company. Adherable polyster film. 4,888,381, Cl. 524-751.000.
Pano, Joseph, to ISCAR Ltd. Metal cutting tool with resilient insert clamp. 4,887,945, Cl. 407-110.000.
Panzarella, James S.: *See*—
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Paquette, John L.: *See*—
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Parker, Robert J. Business card dispenser. 4,887,739, Cl. 221-232.000.
Parnell, James A.: *See*—
Venthem, John C.; Parnell, James A.; Hill, Mark; and Poole, Dan R., 4,888,710, Cl. 364-520.000.
Parrent, Kenneth G., to Moser, Richard J. Apparatus for treatment of ore particles. 4,887,799, Cl. 266-168.000.
Parriaux, Olivier M.: *See*—
Falco, Lucien G.; and Parriaux, Olivier M., 4,887,901, Cl. 356-352.000.
Parsons, Ralph L., Jr. Boom mower attachment for a tractor adjustable for cutting at either side thereof. 4,887,417, Cl. 56-15.200.
Pastor, Jose, to Pitney Bowes Inc. Method and apparatus for verifying a value for a batch of items. 4,888,803, Cl. 380-51.000.
Pastor, Stephen D.: *See*—
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Pastor, Steven D.: *See*—
Odorisio, Paul A.; and Pastor, Steven D., 4,888,423, Cl. 544-238.000.
Patel, Bakulesh B., to Motorola, Inc. Speaker grille assembly. 4,887,690, Cl. 181-150.000.
Patel, Dinesh C.: *See*—
Chang, Yunik; and Patel, Dinesh C., 4,888,354, Cl. 514-424.000.

Patel, Mahesh K.: *See—*
Jones, Howard; Lukacsko, Alison B.; Tencza, Thomas M.; Sarsfield, Beth A.; and Patel, Mahesh K., 4,888,343, Cl. 514-264.000.
Paterson, James L., to Texas Instruments Incorporated. Floating-gate transistor with a non-linear intergate dielectric. 4,888,630, Cl. 357-23.500.
Pattanayak, Deva N.; and Baliga, Bantval J., to General Electric Company. Monolithically integrated lateral insulated gate semiconductor device. 4,888,627, Cl. 357-23.400.
Patton, Robert L.: *See—*
Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,888,167, Cl. 423-306.000.
Paulk, Howard: *See—*
Mobley, Joseph G.; Kozushin, Anatoly; Baher, Saeed; Addison, Steve; Paulk, Howard; and Farmer, James, 4,888,799, Cl. 380-6.000.
Paulus, Cecil H. Well closure assembly with cap-to-casing adapter. 4,887,669, Cl. 166-75.100.
Payne, Peter A.; Bartlett, Jon G.; and Harris, Natalie K., to Cogent Limited. Gas sensor. 4,887,455, Cl. 73-27.00R.
Pedretti, Ugo; Bonfanti, Cesarina; Montani, Enrico; Hakemi, Hassan A.; and Roggero, Arnaldo, to Eniricerche S.p.A. Thermotropic copolyazomethines and process for preparing them. 4,888,409, Cl. 528-129.000.
Peduto, Joseph: *See—*
Braginetz, Paul A.; Leadbetter, Mark R.; and Peduto, Joseph, 4,888,002, Cl. 604-195.000.
Peet, William J., to Babcock & Wilcox Company, The. Superheater outlet steam temperature control. 4,887,431, Cl. 60-667.000.
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Pelc, Kenneth L. Method of making and packaging golf tees. 4,887,817, Cl. 273-210.000.
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Pelletier, Guy. Apparatus for mowing, chipping and blowing. 4,887,418, Cl. 56-249.500.
Peng, Hsiang. Steering wheel assembly. 4,887,484, Cl. 74-556.000.
Penn, Paul E.; and Grissom, Gary R., to Dart Controls, Inc. Electronic speed control interlock. 4,888,813, Cl. 388-838.000.
Pennwalt Corporation: *See—*
Sheetz, Nicholas J., 4,888,090, Cl. 156-665.000.
Percoco, Ann M.: *See—*
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Percoco, Jane M.: *See—*
Percoco, Stephen L.; and Percoco, Jane M., 4,887,856, Cl. 292-337.000.
Percoco, Stephen L.; and Percoco, Jane M., to Percoco, Ann M.; and Percoco, Jane M. Lock mounting assembly. 4,887,856, Cl. 292-337.000.
Permian Research Corporation: *See—*
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Perneczky, George C. Low profile roll cleaning apparatus and self aligning bearing used therein. 4,887,329, Cl. 15-256.530.
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Peters, Michael S.: *See—*
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Peters, Ulf: *See—*
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Peterson, John M., to Teledyne Industries, Inc. Fast, erectable, easily transportable structures. 4,887,397, Cl. 52-86.000.
Peterson, Stephen B.: *See—*
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Pfeifer, Robert F.: *See—*
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Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles. Safety nut assembly for backstand apparatus. 4,887,774, Cl. 242-58.600.
Phillips, James G., Jr.: *See—*
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Phillips, James G., Sr.; Phillips, James G., Jr.; Harlow, Joanne; and Scott, Gordon K., to Burlington Industries, Inc. Cold weather system. 4,887,317, Cl. 2-243.00R.
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Gardner, Lloyd E.; and Kidd, Dennis R., 4,888,316, Cl. 502-20.000.
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Picker International, Inc.: *See—*
Plummer, Steven J.; Ina, Antoine; Tipping, David L.; and Esser, Peter D., 4,888,486, Cl. 250-363.040.
Pielechowski, Craig A.; and Panzarella, James S., to Smith Metal Arts Co., Inc. Tiered tray assembly. 4,887,724, Cl. 211-11.000.
Pierce & Stevens Corporation: *See—*
Melber, George E.; and Wolinski, Leon, 4,888,241, Cl. 428-407.000.
Pike, Roscoe A.; and Golden, Gerald S., to United Technologies Corporation. Method for bonding joints with an organic adhesive using a water soluble amorphous hydrated metal oxide primer. 4,888,079, Cl. 156-319.000.
Pilkington plc: *See—*
Herrington, Richard A.; Flaugher, Jeffrey R.; Borer, John W.; Woodward, Alan C.; and Greenhalgh, Geoffrey, 4,888,038, Cl. 65-114.000.
Pilwat, Gunter; and Rudolph, Jochen, to Kernforschungsanlage Julich GmbH. Apparatus for the cryogenic enrichment of trace substances of a gas stream. 4,887,434, Cl. 62-55.500.
Pioneer Electronic Corporation: *See—*
Kobayashi, Masaki; and Ohta, Minemasa, 4,888,491, Cl. 250-561.000.
Pioneer Video Corporation: *See—*
Kobayashi, Masaki; and Ohta, Minemasa, 4,888,491, Cl. 250-561.000.
Pirovano, Camillo. Trolley for distributing feed into a rectilinear trough in a poultry farm. 4,887,550, Cl. 119-56.200.
Pitney Bowes Inc.: *See—*
Pastor, Jose, 4,888,803, Cl. 380-51.000.
Piveteau, Claude, to Wichard, Societe Anonyme of France. Device for automatically securing a hoist. 4,887,542, Cl. 114-108.000.
PKL Verpackungssysteme GmbH: *See—*
Farber, Jurgen, 4,887,720, Cl. 206-621.200.
Plancon, Michel; and Bertrix, Michel, to Timex Corporation. Stepping motor rotor assembly for an electronic timepiece. 4,888,507, Cl. 310-40.0MM.
Plessey Company plc, The: *See—*
Hart, Peter B.; Chilton, George A. A.; and Kirk, Richard A., 4,888,603, Cl. 346-160.000.
Plessey Overseas Limited: *See—*
Dakin, John P.; and Pratt, David J., 4,888,480, Cl. 250-226.000.
Jarrett, Adrian E., 4,888,502, Cl. 307-520.000.
Skinner, Alexander, 4,887,902, Cl. 356-373.000.
Pletsch, Hubert: *See—*
Wolf, Franz J.; and Pletsch, Hubert, 4,887,801, Cl. 267-140.100.
Plice, Gerald W., to Shure Brothers, Inc. Wind and breath noise protector for microphones. 4,887,693, Cl. 181-242.000.
Plott, John E.: *See—*
Bridgewater, Todd J.; and Plott, John E., 4,887,757, Cl. 227-147.000.
Plumb, Richard A.: *See—*
Brie, Alain; Hsu, Kai; and Plumb, Richard A., 4,888,740, Cl. 367-30.000.
Plumley, Roger D., to Fairchild International Inc. Dual auger continuous mining machine. 4,887,868, Cl. 299-57.000.
Plummer, Steven J.; Ina, Antoine; Tipping, David L.; and Esser, Peter D., to Picker International, Inc. Scanning nuclear camera with automatic orbit shape modification. 4,888,486, Cl. 250-363.040.
Plurien, Pierre: *See—*
Charpin, Jean; Grangeon, Andre ; Pejot, Francis; Plurien, Pierre; Rasneur, Bernard; Richard, Serge; and Veyre, Rene , 4,888,033, Cl. 55-158.000.
Pneumofore S.P.A.: *See—*
Hilfiker, Alfredo, 4,887,580, Cl. 123-564.000.
Pocknell, David, to Dow Corning France S.A. Therapeutic rings. 4,888,074, Cl. 156-217.000.

Poix, Paul J. L.: *See—*
Bernier, Jean-Claude; Poix, Paul J. L.; Rehspringer, Jean-Luc; Vilmin, Gabriel G. J.; and Vilminot, Serge, 4,888,314, Cl. 501-119.000.

Polaroid Corporation: *See—*
Cowan, James J., 4,888,260, Cl. 430-1.000.
Himmelwright, Richard S.; Mehta, Avinash C.; and Taylor, Lloyd D., 4,888,273, Cl. 430-569.000.
Robinson, William C.; and Sanford, Norman A., 4,887,878, Cl. 350-96.130.

Poll, Ian: *See—*
Hasenack, Hendricus J. A.; and Poll, Ian, 4,887,962, Cl. 110-263.000.

Pollard, Andrew: *See—*
Cowburn, David; Rawlings, Stephen P.; and Pollard, Andrew, 4,887,841, Cl. 280-719.000.

Pollo, Joseph L., to American Ball Screw. Externally serviceable ball screw having internal return means. 4,887,480, Cl. 74-459.000.

Polyplastics Co., Ltd.: *See—*
Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, 4,888,127, Cl. 252-299.500.

Polypure, Inc.: *See—*
Reimschuessel, Herbert K.; Chiang, William G.; and Tichenor, George J. W., 4,888,396, Cl. 525-379.000.

Polytech Netting Industries: *See—*
Bateman, Brian, 4,887,337, Cl. 24-136.00R.

Pond, Robert B., Sr. Metal composites with fly ash incorporated therein and a process for producing the same. 4,888,054, Cl. 75-234.000.

Poole, Dan R.: *See—*
Venthem, John C.; Parnell, James A.; Hill, Mark; and Poole, Dan R., 4,888,710, Cl. 364-520.000.

Poppi, Mauro, to Poppi s.P.A. Fast tempo firing process for ceramic materials such as tiles. 4,888,143, Cl. 264-66.000.

Poppi s.P.A.: *See—*
Poppi, Mauro, 4,888,143, Cl. 264-66.000.

Portec, Inc.: *See—*
Brown, Robert D.; and Compton, Richard A., 4,887,708, Cl. 198-831.000.

Porteous, Alexander; and McIntosh, Angus J., to Anderson Strathclyde PLC. Ranging drum shearers. 4,887,867, Cl. 299-42.000.

Porterfield, Richard F.; and Biesecker, Douglas A., to Universal Instruments Corporation. Pick and place nozzle with concentric grooves. 4,887,351, Cl. 29-740.000.

Posey, John L.; and Swank, Ronald W., to Baxter International Inc. Apparatus for sterilizing film and like packaging material. 4,888,155, Cl. 422-49.000.

Poss, Eliasz: *See—*
Toni, Darryl; and Poss, Eliasz, 4,888,451, Cl. 174-94.00R.

Potts, Angela C.; and Gibson, Mark, to American Cyanamid Company. Stable ophthalmic preparations containing acetazolamide. 4,888,168, Cl. 424-78.000.

Povio, Raymond A.: *See—*
Herbert, Glenn M.; Kneisel, Charles S.; McDonald, Russell; Povio, Raymond A.; and Zirilli, Michele D., 4,887,805, Cl. 271-94.000.

Powell, Mark A., to Texmark Enterprises, Inc. Dog training apparatus. 4,887,549, Cl. 119-29.000.

Powell, Roger A. Variable aperture, variable flux density, aerospace solar collector. 4,888,063, Cl. 136-259.000.

Powers, Jeffrey E.: *See—*
Hossack, James M.; Powers, Jeffrey E.; and Billings, John K., 4,888,086, Cl. 156-639.000.

Powlan, Roy Y. Prosthetic device and method of fixation within the medullary cavity of bones. 4,888,024, Cl. 623-23.000.

PPG Industries, Inc.: *See—*
Hartman, Marvis E., 4,888,205, Cl. 427-54.100.

Pramanik, Mukunda B.: *See—*
Carnell, Brian L.; Fansler, John D.; and Pramanik, Mukunda B., 4,887,782, Cl. 244-234.000.

Pratt, David J.: *See—*
Dakin, John P.; and Pratt, David J., 4,888,480, Cl. 250-226.000.

Precision Monolithics, Inc.: *See—*
Bowers, Derek F., 4,888,589, Cl. 341-153.000.

Preh, Elektrofeinmechanische Werke Jacob Preh, Nachf. GmbH & Co.: *See—*
Bauer, Karl-Heinz, 4,887,520, Cl. 98-2.000.
Reuss, Oswald; and Rutterfschmidt, Franz, 4,887,971, Cl. 439-98.000.

Preputnick, George, to AMP Incorporated. Conduction cooled module connector system and method of making. 4,887,353, Cl. 29-830.000.

President and Fellows of Harvard College: *See—*
Barrandon, Yann; and Green, Howard, 4,888,291, Cl. 435-240.241.

Preves, David A., to Argosy Electronics. Analog volume control circuit. 4,888,810, Cl. 381-109.000.

Pribbernow, Dale E.: *See—*
Bacon, Forrest C.; and Pribbernow, Dale E., 4,887,679, Cl. 177-245.000.

Price, James M.: *See—*
Lynde, Gerald D.; and Price, James M., 4,887,668, Cl. 166-55.800.

Price, Timothy J.; and Smith, Royston R., to Lever Brothers Company. Detergent compositions containing calcium pyrophosphate as an antideposition agent. 4,888,123, Cl. 252-135.000.

Pride, Joseph P., III: *See—*
Friedman, Joseph S.; King, John P.; and Pride, Joseph P., III, 4,888,593, Cl. 342-387.000.

Prime Computer, Inc.: *See—*
Allison, Robert; and Lefsky, Brian, 4,888,687, Cl. 364-200.000.
George, Paul L.; Waxman, David M.; Sybel, Randall T.; Mednick, Elliot H.; O'Brien, Kevin J.; and Spatara, Joseph M., 4,888,691, Cl. 364-300.000.

Prince, Curtis L. Rear wheel suspension system for a tricycle vehicle. 4,887,829, Cl. 280-282.000.

Prince, Paul R.: *See—*
Williamson, Warren P., IV; and Prince, Paul R., 4,888,004, Cl. 604-45.000.

Pro Power Corporation: *See—*
Alexander, Carl J., 4,887,357, Cl. 30-383.000.

Probst, Kurt: *See—*
Appel, Hans-Gunter; Ohm, Heinz-Friedrich; Bluhm, Klaus; and Probst, Kurt, 4,888,537, Cl. 318-626.000.

Procter & Gamble Cellulose Company, The: *See—*
Dean, Walter L.; Moore, Danny R.; Owens, James W.; Schoggen, Howard L.; Bourbon, Robert M.; and Cook, Jeffrey T., 4,888,093, Cl. 162-157.600.

Procter & Gamble Company, The: *See—*
Angstadt, John J., 4,888,231, Cl. 428-213.000.
Dubach, Werner F., 4,887,746, Cl. 222-519.000.
Ehrman, Albert M.; Seiden, Paul; Weitzel, Rose M.; and White, Robert L., 4,888,196, Cl. 426-601.000.

Professional Compounding Centers of America, Inc.: *See—*
Wilkinson, William R.; Webber, Marion G.; and King, Dean J., 4,887,790, Cl. 249-52.000.

Proni, Oscar; Fayer, Ervin; Dominick, George G.; and Cambareri, Carmelo R., to Coulter Electronics, Inc. Bellows pump and actuating apparatus. 4,887,473, Cl. 73-864.350.

Proud, Joseph M.: *See—*
Byszewski, Wojciech W.; Butler, Scott J.; Regan, Robert J.; and Proud, Joseph M., 4,888,528, Cl. 315-344.000.

Proudler, Graeme J.: *See—*
Marshall, Alan D.; Mitchell, Christopher J.; and Proudler, Graeme J., 4,888,800, Cl. 380-21.000.

Proux, Gary T.: *See—*
Bollong, Alan B. I.; Bult, Roelof P.; and Proux, Gary T., 4,888,051, Cl. 75-10.110.

Provence, Marc, to Salomon S.A. Cross country ski binding having flexible arms adapted to be mounted to an upper surface. 4,887,832, Cl. 280-615.000.

Prucnal, Paul R.; Elby, Stuart DS.; and Harstead, Edward E., to Columbia University in the City of New York, The Trustees of. Fiber optic tap. 4,887,879, Cl. 350-96.150.

Prusas, Zenon; Uhrig, L. Oscar; and Wisecup, Gene W., to Mead Corporation, The. Primary paper sheet having a surface layer of pulp fines. 4,888,092, Cl. 162-130.000.

Puchy, David P. Surgical stapler providing variable degree of staple closure. 4,887,756, Cl. 227-19.000.

Puckette, Charles M., IV; and Saulnier, Gary J., to General Electric Company. Digital subharmonic sampling down-converter. 4,888,557, Cl. 329-341.000.

Puech, Claude: *See—*
Lacotte, Jean-Pierre; and Puech, Claude, 4,888,266, Cl. 430-141.000.

Pujol Y Tarrago, S. A.: *See—*
Solano, Victorino S.; and Trilla, Antonio S., 4,887,705, Cl. 192-111.00A.

Pungas, Toom A.: *See—*
Radik, Tynu A.; Sjugis, Anatol J.; Pungas, Toom A.; and Korsen, Vilie K., 4,888,530, Cl. 318-254.000.

Purdue University: *See—*
Beremand, Phillips D.; Ohlrogge, John B.; and Kuhn, David N., 4,888,282, Cl. 435-193.000.

Pure Water, Inc.: *See—*
Palmer, David G.; Shannon, David J.; and Vacha, Keith L., 4,888,097, Cl. 203-1.000.

Quad/Tech, Inc.: *See—*
Sainio, Jeffrey W., 4,887,530, Cl. 101-181.000.

Quaker Oats Company, The: *See—*
Wu, Rei-Young, 4,888,180, Cl. 426-618.000.

Quantum Medical Systems, Inc.: *See—*
Chesarek, Richard H., 4,888,694, Cl. 364-413.240.

Quigley, Vincent P.; and Jorkasky, Richard J., II, to Standard Oil Company, The. Process for neutralizing crosslinked poly (acrylic acid). 4,888,367, Cl. 524-17.000.

Quinlan, Kenneth P., to United States of America, Air Force. Vapor phase epitaxy-hydride technique with a constant alloy source for the preparation of InGaAs layers. 4,888,303, Cl. 437-81.000.

Quinn, Arthur A.: *See—*
Nollen, Dennis A.; and Quinn, Arthur A., 4,888,091, Cl. 162-109.000.

R. Bonnard, P. Bonnard, C. Desclozeaux, and BG Innovations (SARL): *See—*
Bonnard, Rene; Bonnard, Pierre; and Desclozeaux, Christopher, 4,887,990, Cl. 474-78.000.

R.G.B. S.p.A.: *See—*
Brusasco, Enzo, 4,888,535, Cl. 318-568.100.

R. J. Reynolds Tobacco Company: *See—*
Bernasek, Edward; Bridle, Kenneth A.; Clapp, William L.; and Fagg, Barry S., 4,887,618, Cl. 131-297.000.
Burcham, Walter E., Jr.; and French, Wilbur J., Jr., 4,887,619, Cl. 131-305.000.

R. P. Scherer Corporation: *See—*
Brox, Werner, 4,888,239, Cl. 428-402.200.

Raaymakers, Antonius H. M.: *See*—
Veenvliet, Hendrik; Raaymakers, Antonius H. M.; Verkerk, Maarten J.; and Witjes, Arnold H., 4,888,201, Cl. 427-38.000.

Rabaey, Dirk H. L. C.: *See*—
Sevenhans, Joannes M. J.; and Rabaey, Dirk H. L. C., 4,888,559, Cl. 330-253.000.

Raber, David C.: *See*—
Montgomery, Darryl R.; and Raber, David C., 4,887,908, Cl. 366-149.000.

Radding, Charles M.; Honigberg, Saul M.; Weissman, Sherman; Rigas, Basil; Welcher, Andrew A.; and Ward, David C., to Yale University. RecA nucleoprotein filament and methods. 4,888,274, Cl. 435-6.000.

Radik, Tynu A.; Sjugis, Anatol J.; Pungas, Toom A.; and Korsen, Vilie K. Two-phase gate motor. 4,888,530, Cl. 318-254.000.

Radisch, Herbert R., Jr.: *See*—
Farr, Andrew F.; and Radisch, Herbert R., Jr., 4,887,613, Cl. 606-159.000.

Raleigh, Freddie L.: *See*—
Hemmelgarn, Thomas L.; and Raleigh, Freddie L., 4,887,360, Cl. 33-503.000.

Ralph, Vernon C.: *See*—
Darbut, Alexander L.; and Ralph, Vernon C., 4,887,883, Cl. 350-96.210.

Ramesh, Subramanian, to North American Philips Corporation. Method of reduced stress recrystallization. 4,888,302, Cl. 437-82.000.

Ramirez de Aqudelo, Magdalena M.; and Galarraga, Carmen E., to Intevep, S.A. Catalytic system for the hydroconversion of heavy oils. 4,888,104, Cl. 208-112.000.

Ramnarine, Wayne D., to Nabisco Brands, Inc. Method for extrusion of baked goods. 4,888,192, Cl. 426-448.000.

Ramtron Corporation: *See*—
Mobley, Kenneth J., 4,888,733, Cl. 365-145.000.

Rannie, James B.: *See*—
Auxier, Thomas A.; Rannie, James B.; and Field, Robert E., 4,887,663, Cl. 165-47.000.

Rapps, Peter: *See*—
Knoll, Peter; Konig, Winfried; and Rapps, Peter, 4,888,699, Cl. 364-449.000.

Rasmussen, Trent T. Ice fishing reel winding device. 4,887,777, Cl. 242-106.000.

Rasneur, Bernard: *See*—
Charpin, Jean; Grangeon, Andre ; Pejot, Francis; Plurien, Pierre; Rasneur, Bernard; Richard, Serge; and Veyre, Rene , 4,888,033, Cl. 55-158.000.

Rates Technology Inc.: *See*—
Weinberger, Gerald J.; Lee, Roger C.; and Miller, Stanley F., 4,888,822, Cl. 379-130.000.

Ratke, Richard; and Ellison, Donald E., to United Technologies Automotive, Inc. Brake/shift interlock for an automatic transmission shift control mechanism. 4,887,702, Cl. 192-4.00A.

Rausing, Hans, to Tetra Pak Finance & Trading S.A. Fluid pack and process for the production thereof. 4,887,765, Cl. 229-123.200.

Rautakorpi, Paavo, to Oy Tampella AB. Method and an apparatus for drying a paper web or the like. 4,887,362, Cl. 34-41.000.

Ravichandran, Ramanathan; and Pastor, Stephen D., to Ciba-Geigy Corporation. Substituted hydroxylamine ester stabilizers. 4,888,444, Cl. 564-300.000.

Rawlings, Stephen P.: *See*—
Cowburn, David; Rawlings, Stephen P.; and Pollard, Andrew, 4,887,841, Cl. 280-719.000.

Rawlins, Mary H.: *See*—
Nixdorf, Richard D.; and Rawlins, Mary H., 4,888,084, Cl. 156-600.000.

Raychem Corporation: *See*—
Clark, Brian; Uken, William D.; Schoenstein, Paul; and Camin, Geary, 4,888,070, Cl. 156-48.000.
Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 4,888,098, Cl. 204-1.00R.

Raynet Corporation: *See*—
Levinson, Frank H., 4,887,880, Cl. 350-96.150.

Razafindrazaka, Lioka, to Commissariat A L'Energie Atomique. Fuel assembly grid for light water reactor. 4,888,152, Cl. 376-462.000.

Readshaw, Lenard T.; VanVelzen, Cornelis N.; Paquette, John L.; and McKeown, Kenneth O., to Innovations Ltd. Saw benching rolls. 4,887,494, Cl. 76-27.000.

Rebiez, Gabriel M.; and Rutledge, David B., to California Institute of Technology. Millimeter and submillimeter wave antenna structure. 4,888,597, Cl. 343-778.000.

Red Bud Industries, Inc.: *See*—
Voges, Kenneth, 4,887,502, Cl. 83-479.000.

Redenbarger, Philip D.; and Megginson, George W., to B. F. Goodrich Company, The. Disc brake. 4,887,696, Cl. 188-73.450.

Reed Tool Company: *See*—
Drake, Eric F., 4,887,493, Cl. 76-5.00R.

Regan, Robert J.: *See*—
Byszewski, Wojciech W.; Butler, Scott J.; Regan, Robert J.; and Proud, Joseph M., 4,888,528, Cl. 315-344.000.

Rehspringer, Jean-Luc: *See*—
Bernier, Jean-Claude; Poix, Paul J. L.; Rehspringer, Jean-Luc; Vilmin, Gabriel G. J.; and Vilminot, Serge, 4,888,314, Cl. 501-119.000.

Reichel, Kenneth R., to Audio-Technica U.S., Inc. Variable pattern microphone system. 4,888,807, Cl. 381-92.000.

Reichert, Hansjoerg; Scharf, Ludwig; Goedecke, Heidemarie; and Weidlcih, Herbert, to Siemens Aktiengesellschaft. Method for generating a sunken oxide. 4,888,301, Cl. 437-72.000.

Reichner, Philip, to Westinghouse Electric Corp. Low circumferential voltage gradient self supporting electrode for solid oxide fuel cells. 4,888,254, Cl. 429-31.000.

Reid, Bruce A.: *See*—
Kallin, Fredrik L. N.; and Reid, Bruce A., 4,888,481, Cl. 250-231.0SE.

Reid, Lee R., to Texas Instruments Incorporated. Intelligent multiprobe tip. 4,888,550, Cl. 324-158.00P.

Reimer, Peter. Ornamental strip light mounting means. 4,888,671, Cl. 362-250.000.

Reimschuessel, Herbert K.; Chiang, William G.; and Tichenor, George J. W., to Polypure, Inc. Novel cationic acrylamide polymers and processes for their preparation. 4,888,396, Cl. 525-379.000.

Reinecke, Paul: *See*—
Brandes, Wilhelm; Kaspers, Helmut; Reinecke, Paul; Scheinpflug, Hans; and Kramer, Wolfgang, 4,888,349, Cl. 514-383.000.

Remers, William A.; and Sami, Salah M., to University Patents, Inc. 6-substituted mitomycin analogs. 4,888,341, Cl. 514-410.000.

ReMine, Walter J.; and Belka, Anthony M., to Minnesota Mining and Manufacturing Company. False alarm minimization and direction determination methods. 4,888,579, Cl. 340-572.000.

Repetti, Ronald V.: *See*—
Marinaccio, Paul J.; and Repetti, Ronald V., 4,888,115, Cl. 210-636.000.

Repligen Corporation: *See*—
Palmer, John L.; and Anilionis, Algis, 4,888,280, Cl. 435-69.700.

Reppen, William D. Wheeled carrier for a snow plow. 4,887,838, Cl. 280-656.000.

Research Corporation: *See*—
Curtiss, Roy, III, 4,888,170, Cl. 424-93.000.

Research Development Corporation of Japan: *See*—
Yamaguchi, Youko; and Shimizu, Hiroshi, 4,888,814, Cl. 382-21.000.

Reuss, Oswald; and Rutterfschmidt, Franz, to Preh, Elektrofeinmechanische Werke Jacob Preh, Nachf, GmbH & Co. Re-shielded coupling part. 4,887,971, Cl. 439-98.000.

Reuther, Wolfgang: *See*—
Ebel, Klaus; Reuther, Wolfgang; Fikentscher, Rolf; Lach, Dietrich; Streicher, Rolf; and Schaffer, Ortwin, 4,888,412, Cl. 528-230.000.

Revesz, Michael S.; Burkett, Harold G., Jr.; and Gilbert, Robert C., to Viscom Systems, Inc. Electronic product information display system. 4,888,709, Cl. 364-518.000.

Reyne, Darwin O. Controlled wick-type herbicide applicator. 4,887,384, Cl. 47-1.500.

Rheem Manufacturing Company: *See*—
Shellenberger, Timothy J., 4,887,959, Cl. 431-46.000.

Rial, Terry. Grease absorption box for roof use. 4,887,588, Cl. 126-299.00R.

Rice, Allen C. Luggage to carry suits/dresses. 4,887,700, Cl. 190-111.000.

Rice, James M.; and Mahler, Bruce P., to 501 Ohmega Electronics, Inc. Circuit board material and method of making. 4,888,574, Cl. 338-309.000.

Richard, Serge: *See*—
Charpin, Jean; Grangeon, Andre ; Pejot, Francis; Plurien, Pierre; Rasneur, Bernard; Richard, Serge; and Veyre, Rene , 4,888,033, Cl. 55-158.000.

Richard Wolf GmbH: *See*—
Wurster, Helmut; and Krauss, Werner, 4,888,746, Cl. 367-138.000.

Richards, William D., to Ophthalmic Ventures Limited Partnership. Adjustable surgical staple and method of using the same. 4,887,601, Cl. 606-219.000.

Richon, Dominique; De Pous, Olivier; and Fontaine, Pierre, to Battelle Memorial Institute. Pulverulent silicon nitride composition including oxidized silicon carbide whiskers. 4,888,310, Cl. 501-92.000.

Ricoh Company, Ltd.: *See*—
Ogasawara, Fumihiro, 4,888,766, Cl. 370-95.100.
Takeyama, Yoshinobu, 4,888,777, Cl. 372-38.000.
Tomita, Masami; Nomura, Yoshihiro; Ide, Noriaki; and Ohtaki, Kazumi, 4,888,263, Cl. 430-106.000.

Rigas, Basil: *See*—
Radding, Charles M.; Honigberg, Saul M.; Weissman, Sherman; Rigas, Basil; Welcher, Andrew A.; and Ward, David C., 4,888,274, Cl. 435-6.000.

Rijksuniversiteit te Groningen: *See*—
Konings, Willem N.; and van Boven, Aart, 4,888,284, Cl. 435-183.000.

Riley, Robert E.; and Naravan, Thirumurti, to BASF Corporation. Isocyanate terminated quasi-prepolymers useful for preparing polyurethane/polyisocyanurate foams having low thermal conductivity. 4,888,365, Cl. 521-157.000.

Ringger, Manfred: *See*—
Hauser, Karl-Heinz; Heissel, Uwe; Inauen, Walter; Neff, Karl; and Ringger, Manfred, 4,887,477, Cl. 74-89.170.

Riotte, Jean-Paul: *See*—
Belbel, Elie; Boucheron, Thierry; Lauraire, Michel; and Riotte, Jean-Paul, 4,888,661, Cl. 361-102.000.

Ritter, Charles H. Toothbrush sterilizer with automatic control. 4,888,487, Cl. 250-455.100.

Rivaud, Lydia L.; Roselle, Paul; and Losee, David, to Eastman Kodak Company. Process to eliminate the re-entrant profile in a double polysilicon gate structure. 4,888,298, Cl. 437-43.000.

Rizzi, Joseph D.: *See*—
Stutz, William A.; Kiss, Laszlo A.; and Rizzi, Joseph D., 4,888,607, Cl. 354-323.000.

Robert Bosch GmbH: *See*—
Gneiss, Heinz, 4,887,462, Cl. 73-118.200.
Hemminger, Hermann; Joos, Eugen; Jundt, Werner; and Werner, Peter, 4,888,697, Cl. 364-431.110.
Knoll, Peter; Konig, Winfried; and Rapps, Peter, 4,888,699, Cl. 364-449.000.
Siegel, Heinz, 4,887,870, Cl. 303-116.000.
Robert Krups Stiftung & Co. KG.: *See*—
Hoffmann, Erich, 4,888,465, Cl. 219-301.000.
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Roberts, Richard E.: *See*—
McRae, Doris J.; and Roberts, Richard E., 4,887,920, Cl. 400-63.000.
McRae, Doris J.; and Roberts, Richard E., 4,888,730, Cl. 364-900.000.
Robin, Mark L.: *See*—
Halpern, Donald F.; and Robin, Mark L., 4,888,139, Cl. 562-840.000.
Robinson, Mark D.; and Farrell, Eugene A., to Carthage Machine Co., Div. of Industrial General Corp. Cassette knife for chipper. 4,887,772, Cl. 241-92.000.
Robinson, William C.; and Sanford, Norman A., to Polaroid Corporation. Optical modulation device. 4,887,878, Cl. 350-96.130.
Rockhill, Sondra. Unforgettable umbrella method. 4,887,543, Cl. 116-201.000.
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Dyke, Harry J., 4,888,765, Cl. 370-95.100.
Harwood, Craig E.; and Strathman, Lyle R., 4,888,599, Cl. 340-812.000.
McGinn, Vincent P.; and Goldberg, Ira B., 4,888,547, Cl. 324-58.50A.
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Rodemann, Will B. Deployable flotation device. 4,887,541, Cl. 114-68.000.
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Rodite, Robert R.: *See*—
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Isnardi, Michael A.; Smith, Terrence R.; Fuhrer, Jack S.; and Roeder, Barbara J., 4,888,641, Cl. 358-141.000.
Roethel, Henry G.; and Leigh, James P., to Meyer Company, The. One piece dispensing valve. 4,887,742, Cl. 222-153.000.
Rogers, Richard B., to Dow Chemical Company, The. Fluorophenoxy compounds, herbicidal compositions and methods. 4,888,050, Cl. 71-108.000.
Roggero, Arnaldo: *See*—
Pedretti, Ugo; Bonfanti, Cesarina; Montani, Enrico; Hakemi, Hassan A.; and Roggero, Arnaldo, 4,888,409, Cl. 528-129.000.
Rohe, Clair F.: *See*—
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Rohra, Alois: *See*—
Geidel, Helmut; and Rohra, Alois, 4,887,424, Cl. 60-39.080.
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Rojc, Karl J., to Aspen Industries, Inc. Cooling airflow coupling apparatus for avionic trays. 4,888,664, Cl. 361-383.000.
Roll, Karl-Fritz, to Siemens Aktiengesellschaft. Mirror light unit. 4,888,668, Cl. 362-291.000.
Romano, Antonio, to Campagnolo S.r.l. Cable-guide element for the rear derailer of a bicycle. 4,887,482, Cl. 74-502.600.
Rondeau, George; and Soubrier, Pierre, to Baxter International Inc. Apparatus for filling bags or pouches with a perfusion liquid. 4,887,411, Cl. 53-493.000.
Rorie, Leon: *See*—
Smith, Gerald J.; Trask, Elwood G.; Ellis, Paul; Johnston, Jon; Campbell, Brian; and Rorie, Leon, 4,888,234, Cl. 428-234.000.
Roselle, Paul: *See*—
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Rosenbaum, Georges: *See*—
Lang, Gerard; Forestier, Serge; Hocquaux, Michel; Grollier, Jean-Francois; and Rosenbaum, Georges, 4,888,026, Cl. 8-405.000.
Rosenberg, Arnold M.; Gaidis, James M.; and Kindt, Lawrence J., to W. R. Grace & Co.-Conn. Silica fume slurry. 4,888,058, Cl. 106-98.000.
Roshdy, Constance E.; Cerwin, Robert J.; and Alpern, Marvin, to Ethicon, Inc. Retainer for surgical sutures. 4,887,710, Cl. 206-63.300.
Rossi, Alexander N.; and Sancen, Mario N., to Fluoroware, Inc. Wafer disk location monitoring system and tagged process carriers for use therewith. 4,888,473, Cl. 235-376.000.
Roth, Martin; Flury, Peter; and Eldin, Sameer H., to Ciba-Geigy Corporation. Copolymes formed from N-hydroxyphenylmaleinimide (derivatives) and allyl compounds. 4,888,402, Cl. 526-262.000.
Rothen, Johann, to WABCO Westinghouse Fahrzeugbremsen GmbH. Apparatus for the continuous control of solenoid valves which are normally designed for intermittent operation. 4,887,636, Cl. 137-487.500.
Rothschild, Mordechai; Black, Jerry G.; and Ehrlich, Daniel J., to Massachusetts Institute of Technology. Hydrolysis-induced vapor deposition of oxide films. 4,888,203, Cl. 427-53.400.
Rotini, Leone G.; and Marchi, Egidio, to Alfa Wassermann S.p.A. Galenic formulations with programmed release containing naproxen. 4,888,178, Cl. 424-468.000.
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Rotondo, Richard J., 4,887,691, Cl. 181-210.000.
Rotondo, Richard J., to Rotondo/Penn-Cast. Modular wall construction using posts and panels. 4,887,691, Cl. 181-210.000.
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Rowson, Graham P.: *See*—
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Rudd, M. David, Sr., to Bean, W. Ralph, a part interest. Hair sculpturing razor. 4,887,356, Cl. 30-30.000.
Rudiger, Gunther; and Peters, Ulf, to MIT Beschrankter Haftung. Plaster for conducting skin patch tests. 4,887,611, Cl. 128-743.000.
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Rudolph, Lothar; Eicken, Karl; Zeeh, Bernd; Meyer, Norbert; and Wuerzer, Bruno, to BASF Aktiengesellschaft. N-phenyltetrahydrophthalimide compounds. 4,888,046, Cl. 71-90.000.
Ruge, Arthur A.; and Kenagy, Donald A., to Ceradyne, Inc. Dampening system roller for offset printing presses. 4,887,528, Cl. 101-148.000.
Ruhig, William E., Jr.: *See*—
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Ruppert, Heinrich W.; and Gatschmann, Klaus G., to EFKA-Werke Fritz Kiehn GmbH. Tobacco product for the personal preparation of a cigarette, in particular filter cigarette. 4,887,617, Cl. 131-70.000.
Rush, James B.; Bryan, James S.; Gunter, Jonas L.; Dillard, Guy W.; Meadows, Roger D.; and Henry, Pearison W., to Dayco Products, Inc. Branches hose construction, joint construction and part therefor, and methods of making the same. 4,887,851, Cl. 285-158.000.
Rush, William F.; and Huebler, James E., to Institute of Gas Technology. Fluid distribution to multiple users through distributed intelligence sub-centers. 4,888,706, Cl. 364-510.000.
Rushman Draperies, Inc.: *See*—
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Rusin, Mark M., to Dexta Corporation. Adjustable armrest. 4,887,866, Cl. 297-421.000.
Rusnack, Theodore J.: *See*—
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Russ, David E., to Sundstrand Corporation. Sequential mechanical mode shifter. 4,887,490, Cl. 74-844.000.
Russell, Jack. Method and apparatus for controlling stepmotor mechanical drives. 4,888,541, Cl. 318-696.000.
Rutimann, Peter, to Feller AG. Plugging apparatus for the transmission of electrical energy. 4,887,881, Cl. 350-96.200.
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Ryntz, Rose A., to Du Pont de Nemours, E. I., and Company. Polyester graft copolymers, flexible coating compositions comprising same and branched polyester macromers for preparing same II. 4,888,399, Cl. 525-440.000.
Rytand, David H. Floating dock. 4,887,654, Cl. 114-267.000.
Ryu, Shiro; and Mochizuki, Kiyofumi, to Kokusai Denshin Denwa Kabushiki Kaisha. Polarization diversity light receiving system using baseband combining. 4,888,817, Cl. 455-619.000.
Saeki, Keiso: *See*—
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Saia, Wilburn H. F. Structural member for buildings. 4,887,406, Cl. 52-694.000.
Sainio, Jeffrey W., to Quad/Tech, Inc. Web registration control system. 4,887,530, Cl. 101-181.000.
Saint-Gobain Emballage: *See*—
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Saito, Kazuharu; Hiraguri, Masao; Yamada, Sadao; and Shiozawa, Junichi, to Kabushiki Kaisha Sankyo Seiki Seisakusho and Toto, Ltd. Turret apparatus. 4,887,345, Cl. 29-568.000.
Saito, Naoki; and Harada, Toru, to Fuji Photo Film Co., Ltd. Recording material containing leuco dye. 4,888,322, Cl. 503-215.000.
Saitoh, Hidetoshi: *See*—
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Saji, Kosaburo; Yamamoto, Shigeru; and Imai, Katsuhiko, to Nippon Electric Glass Company, Limited. Translucent glass brick made of opal glass with light diffusible crystal particles. 4,887,404, Cl. 52-306.000.
Sakae Ringyo Co., Ltd.: *See*—
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Sakai, Toshikazu; and Higomura, Makoto, to Canon Kabushiki Kaisha. Device for controlling positioning of an object. 4,888,536, Cl. 318-592.000.
Sakakibara, Yasuyuki: *See*—
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Sakayori, Kiyoshi; Iwasaki, Shinichi; Ishida, Yozo; Shinogaya, Toshikazu; and Ishizuka, Yuzo, to Bridgestone Corporation. Waterproof nut. 4,887,950, Cl. 411-302.000.
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Sakimori, Hideharu; Komatsu, Yoji; Ito, Masahiro; and Ohkuma, Nobuyoshi, to Mazda Motor Corporation. Method and apparatus for fitting component sections. 4,887,341, Cl. 29-156.40R.
Sakuma, Kazuhiro; Fukumoto, Yasuhiko; and Tomioka, Akihiro, to Japan Aviation Electronics Industry Ltd. Temperature-compensating circuit for accelerometers. 4,887,467, Cl. 73-517.00B.
Sakuraba, Takahiro: *See*—
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Sallberg, Michael E. R., to Selcro Limited. Electrically conductive board. 4,888,232, Cl. 428-215.000.
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Sander, Wendell; Huston, Dick; Broedner, Walter; and Huston, Clifford, to Little Blue Limited Partnership. Peripheral device interface and controller. 4,888,680, Cl. 364-200.000.
Sander, Willy M., to Dictaphone Corporation. Communications recorder having a unique identification code and secure method and apparatus for changing same. 4,888,652, Cl. 360-5.000.
Sandvig, Timothy C.; Bartizal, Dennis C.; Scholz, Matthew T.; Campagna, Anthony J.; and Libbey, Chris J., to Minnesota Mining and Manufacturing Company. Resin-impregnated foam materials and methods. 4,888,225, Cl. 428-71.000.
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Sannohe, Kanetaro; Senzaki, Hirohisa; and Sohama, Yoshio, to Mitsui Kinzoku Kogyo Kabushiki Kaisha. Copper powder for electroconductive paints and process for production thereof. 4,888,216, Cl. 427-216.000.
Sano, Tadaaki: *See*—
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Sanshin Kogyo Kabushiki Kaisha: *See*—
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Santarossa, Mario. Recoil pad for rifle. 4,887,374, Cl. 42-73.000.
Santiago, Moises, to Union Carbide Corporation. Method for pressurizing liquid. 4,887,651, Cl. 141-1.000.
Sanwo, Ikuo J.; and Milby, Gregory H., to NCR corporation. Three input exclusive OR-NOR gate circuit. 4,888,499, Cl. 307-471.000.
Sanwo, Ikuo J.; Simeral, John D.; and Daniel, Richard A., to NCR Corporation. ECL to CMOS converter. 4,888,501, Cl. 307-475.000.
Sanyo Electric Co., Ltd.: *See*—
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Sato, Hideo: *See*—
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Sato, Shoichi; Osame, Yasuhiro; and Tazaki, Seiji, to Showa Aluminum Corporation. Process for producing flux for brazing. 4,888,067, Cl. 148-26.000.
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Sato, Yoichi, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor memory device. 4,888,737, Cl. 365-203.000.
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Scherber, Werner; and Meisel, Thomas, to Dornier System GmbH. Controlled transparency. 4,887,890, Cl. 350-357.000.
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Leonard, Thomas W.; Mikula, Karol K.; and Schlesinger, Marcia S., 4,888,362, Cl. 514-724.000.
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Schmitt, Wolfgang; and Bege, Dietmar, to Siemens Aktiengesellschaft. Method and apparatus for the determination of the setting process in an inorganic aqueous binder system. 4,888,818, Cl. 324-439.000.
Schmitz, Friedrich, to Deutsche Thomson-Brandt GmbH. Circuitry for adjusting the amplitude of analog signals. 4,888,496, Cl. 307-264.000.
Schnarel, Charles B., to Tektronix, Inc. Apparatus for storing multi-bit pixel data. 4,888,582, Cl. 340-703.000.
Schochetman, Gerald; and Massey, Richard J., to Igen, Inc. Method of catalyzing chemical reactions. 4,888,281, Cl. 435-72.000.
Schoenberg, Stephen J. Cover for a disposable hypodermic needle. 4,888,001, Cl. 604-162.000.
Schoeneweis, Melvin W. Container and one-piece blank for forming same. 4,887,766, Cl. 229-125.000.
Schoenstein, Paul: *See—*
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Ogata, Kazumi; Ogawa, Takahiro; and Sakaue, Takahiro, 4,888,329, Cl. 514-100.000.

Senor, Ronald E.: *See*—
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Sevier, Jeff R. Load enclosing chain release. 4,887,946, Cl. 410-32.000.
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Chu, George; Nathan, Ranga; and Seyedin, Saeid, 4,888,366, Cl. 523-115.000.
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Shannon, Thomas G.; and Brunelle, Daniel J., to General Electric Company. Crosslinkable polycyclic polycarbonate oligomer and methods for their preparation and use. 4,888,411, Cl. 528-199.000.
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Sharrah, Raymond L., to Streamlight, Inc. Micro-flashlight. 4,888,670, Cl. 362-205.000.
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Shaw, Terrance. Music teaching device. 4,887,507, Cl. 84-474.000.
Shedd, William D.; and Stotesbury, Gregory S., to Aftco Mfg. Co., Inc. Rod extension and method of using the extension in deep-sea fishing. 4,887,375, Cl. 43-21.200.
Sheehan, Larry A.; and James, John R., to Bo-James Co., Inc. Fishing lure. 4,887,378, Cl. 43-42.250.
Sheetz, Nicholas J., to Pennwalt Corporation. Etchant for aluminum containing surfaces and method. 4,888,090, Cl. 156-665.000.
Shefer, Ruth; Klinkowstein, Robert E.; and Petrasso, Richard, to Science Research Laboratory, Inc. Apparatus for performing dual energy medical imaging. 4,887,604, Cl. 128-654.000.
Shelburne, Charles E., to Minnesota Mining and Manufacturing Company. Method and composition for the diagnosis of Lyme disease. 4,888,276, Cl. 435-7.000.
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Hasenack, Hendricus J. A.; and Poll, Ian, 4,887,962, Cl. 110-263.000.
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Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,888,361, Cl. 518-700.000.
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Shellenberger, Timothy J., to Rheem Manufacturing Company. Gas furnace with improved ignition. 4,887,959, Cl. 431-46.000.
Shen, Bing W.: *See*—
Chen, Ih-Chin; Shen, Bing W.; Bohlman, James G.; and Tsai, Hun-Lian, 4,888,820, Cl. 361-313.000.
Shepard, Melvin E.; and Bussinger, Allen L., to Amigo Sales, Inc. Steerable motorized three-wheeled vehicles for use by the handicapped and others desiring assistance. 4,887,685, Cl. 180-209.000.
Sheridan, Michael, to Ethylene Corp. Combination structure for sampling the contents of a reactor vessel including pH monitoring means. 4,888,154, Cl. 422-49.000.
Sherman, Michael, to Synthes (U.S.A.). Open backed pedicle screw. 4,887,596, Cl. 606-61.000.
Sherwood Medical Company: *See*—
D'Alo, Herbert F.; and Enger, Christine D., 4,888,008, Cl. 604-411.000.
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Shibata, Ryoichi; Kinugawa, Kiyoshi; Iimura, Tsutomu; and Sawano, Yasuo, to Hitachi Metals, Ltd. Heat roll for electrophotography. 4,888,464, Cl. 219-216.000.
Shida, Toshimitsu, to Fuji Valve Co., Ltd. Hydraulic valve lash adjuster. 4,887,566, Cl. 123-90.510.
Shidara, Keiichi: *See*—
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Shikichi, Satoshi; and Hosoya, Hideki, to Canon Kabushiki Kaisha. Optical information recording and reproducing apparatus. 4,888,756, Cl. 369-45.000.
Shiley, Richard H.; Hughes, Randall E.; Webster, John R.; Hinckley, Conrad C.; Smith, Gerald V.; and Wiltowski, Tomasz, to Southern Illinois University, The Board of Trustees of; and Illinois State Geological Survey, The. Desulfurization of carbonaceous materials. 4,888,029, Cl. 44-622.000.
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Shimizu, Motoharu, to Hitachi Metals, Ltd. Surface multipolar rare earth-iron-boron rotor magnet and method of making. 4,888,512, Cl. 310-156.000.
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Shimizu, Toshio; and Hirose, Kouji, to Seikosha Co., Ltd. Colored articles with interference layers made of a composite of silicon dioxide and silicon carbide. 4,887,886, Cl. 350-166.000.
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Sano, Toshikazu, 4,887,763, Cl. 229-71.000.
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Shinzawa, Motohiro; and Kanesaki, Nobukazu, to Nissan Motor Company, Limited. Exhaust particle removing system for an engine. 4,887,427, Cl. 60-286.000.

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Shionogi & Co., Ltd.: *See*—
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Shiozawa, Kouji; Takai, Haruko; Takatsuna, Kazutoshi; Okamoto, Nobukazu; Okumura, Yoshiharu; and Imai, Chihiro, to Toa Nenryo Kogyo Kabushiki Kaisha. Process for preparing aminopropyl alkoxy silanes. 4,888,436, Cl. 556-413.000.

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Shirai, Kenji: *See*—
Nishii, Michiharu; Mizuno, Genji; Tada, Yoshihiko; Nomura, Yoshihisa; Kato, Masahiko; Shirai, Kenji; and Tanoue, Junichi, 4,887,869, Cl. 303-114.000.

Shiraishi, Hisashi; Kimura, Tsutomu; and Hichinuma, Kazuhiro, to Fuji Photo Film Co., Ltd. Signal processing method in autoradiography. 4,888,695, Cl. 364-413.130.

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Shoger, Kirk D.: *See*—
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Shoji, Toru: *See*—
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Miyano, Masatsru; Shone, Robert L.; and Sohn, Daniel D., 4,888,356, Cl. 514-456.000.

Shop-Vac Corporation: *See*—
Woodhall, Michael B.; Gough, Brian; and Wilcox, Russell G., 4,887,330, Cl. 15-322.000.

Shoptaw, David R., to Hydro-Craft, Inc. High accuracy turbine flowmeter with optical sensor. 4,887,469, Cl. 73-861.770.

Shotwell, Duane E., to Hughes Tool Company. Earth boring bit with pin mounted compensator. 4,887,675, Cl. 175-228.000.

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Sato, Shoichi; Osame, Yasuhiro; and Tazaki, Seiji, 4,888,067, Cl. 148-26.000.
Sukimoto, Minobu; Yamazaki, Katsumi; Hirunuma, Naohisa; Taguchi, Seijiro; Usui, Tadashi; Akiyoshi, Yasushi; Nogami, Toyoichiro; and Kaneko, Toyoji, 4,887,557, Cl. 123-52.0MC.

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Shure Brothers, Inc.: *See*—
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Wacker, Robert L.; Shuster, Donald E.; Sharpless, John; Knobbe, Alan J.; and Murphy, James C., 4,887.770, Cl. 239-703.000.

Sibley, Kenneth R.; and Bambeck, Gregory S. Artificial lure with time release attractant. 4,887,376, Cl. 43-42.060.

Sica, Louis, Jr., to United States of America, Navy. Two-way optic communication system for atmospheric use. 4,888,816, Cl. 455-607.000.

Sidles, James, to B. F. Goodrich Company, The. Composite laminates comprising matrix bound plies having interlocked transverse fibers and a method of making the same. 4,888,228, Cl. 428-86.000.

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Gupta, Subhash; Siduh, Sanjiv S.; and Vlach, Frank, 4,888,692, Cl. 364-402.000.

Sie, Swan T.; Drent, Eit; and Jager, Willem W., to Shell Oil Company. Process for the production of methanol and catalyst composition for said process. 4,888,361, Cl. 518-700.000.

Siebert, Gary R.; and Armstrong, Jean, to Becton, Dickinson and Company. Monoclonal antibodies recognizing L-thyroxine. 4,888,296, Cl. 436-500.000.

Siegel, Heinz, to Robert Bosch GmbH. Feed pump for brake systems. 4,887,870, Cl. 303-116.000.

Siegel, Louis. Vibratory medicator. 4,887,594, Cl. 128-36.000.

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Karabed, Razmik; and Siegel, Paul H., 4,888,779, Cl. 371-43.000.

Siegrist, Stanley R., to GTE Products Corporation. Preloaded electrical contact. 4,887,980, Cl. 439-842.000.

Siemens Aktiengesellschaft: *See*—
Adam, Peter; Hoffmann, Ferdinand; and Rub, Michael, 4,887,916, Cl. 384-192.000.
Adam, Peter; Lindner, Adolf; Schilling, Werner; and Wehner, Ewald, 4,888,508, Cl. 310-42.000.
Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, 4,888,081, Cl. 156-359.000.
Daeges, Johannes; and Van Der Linden, Klaus, 4,888,516, Cl. 310-323.000.
De Man, Erik; and Noll, Tobias, 4,888,723, Cl. 364-786.000.
Dotzer, Peter; Glaser, Heinz; Hahn, Reinhold; and Mayr, Ernst, 4,887,423, Cl. 57-295.000.
Haug, Friedrich, 4,888,764, Cl. 370-85.100.
Heinzl, Joachim; Lehmann, Manfred; and Trausch, Gunter E., 4,888,598, Cl. 346-140.00R.
Mueller, Ruediger, 4,888,625, Cl. 357-17.000.
Reichert, Hansjoerg; Scharf, Ludwig; Goedecke, Heidemarie; and Weidlcih, Herbert, 4,888,301, Cl. 437-72.000.
Roll, Karl-Fritz, 4,888,668, Cl. 362-291.000.
Schmitt, Wolfgang; and Bege, Dietmar, 4,888,818, Cl. 324-439.000.
Weibelzahl, Manfred; and Wild, Georg, 4,888,674, Cl. 363-35.000.

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Wakeman, Russell J., 4,887,562, Cl. 123-90.120.

Sigg, Hans, to MAAG Gear-Wheel & Machine, Co. Ltd. Bowl-mill gearing. 4,887,489, Cl. 74-801.000.

Signal Science, Inc.: *See*—
Friedman, Joseph S.; King, John P.; and Pride, Joseph P., III, 4,888,593, Cl. 342-387.000.

Silverman, Keith B.: *See*—
Frisco, Frank D.; Kadash, Raymond J.; and Silverman, Keith B., 4,887,903, Cl. 356-372.000.

Simeral, John D.: *See*—
Sanwo, Ikuo J.; Simeral, John D.; and Daniel, Richard A., 4,888,501, Cl. 307-475.000.

Simjian, Luther G., to Command Automation, Inc. Cart with foldable side panels. 4,887,836, Cl. 280-651.000.

Simmerman, Richard H.; and Wiederer, Gregg E., to Hanger-Tight Company. Garment hanger caddy. 4,887,727, Cl. 211-124.000.

Sinclair, A. Richard: *See*—
Graham, John W.; and Sinclair, A. Richard, 4,888,240, Cl. 428-403.000.

Singer, Robert H.; and Lawrence, Jeanne B., to University of Massachusetts Medical Center. In-situ hybridization to detect nucleic acid sequences in morphologically intact cells. 4,888,278, Cl. 435-6.000.

Singh, Param I.: *See*—
Kung, Robert T. V.; and Singh, Param I., 4,888,011, Cl. 623-3.000.
Lederman, David M.; Singh, Param I.; and Strohl, Clair L., Jr., 4,888,009, Cl. 623-2.000.

Sinn, Robert S.: *See*—
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,888,324, Cl. 514-25.000.

Sinz, Wolfgang; and Kotulla, Gunther, to VDO Adolf Schindling AG. System for storing information with comparison of stored data values. 4,888,686, Cl. 364-200.000.

Sjugis, Anatol J.: *See*—
Radik, Tynu A.; Sjugis, Anatol J.; Pungas, Toom A.; and Korsen, Vilie K., 4,888,530, Cl. 318-254.000.

SKF Textilmaschinen-Komponenten GmbH: *See*—
Krehl, Gerhard; and Vogeler, Helmut, 4,888,452, Cl. 174-101.000.

SKF (U.K) Limited: *See*—
Hamblin, Ronald F., 4,887,919, Cl. 384-562.000.

SkiDeer, Inc.: *See*—
Hallett, Thomas D.; and Bierdeman, Donald H., 4,887,823, Cl. 280-19.000.

Skinner, Alexander, to Plessey Overseas Limited. Optical transducer. 4,887,902, Cl. 356-373.000.

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Skovmand, Timothy J., to National Semiconductor Corporation. Voltage multiplier compatible with a self-isolated C/DMOS process. 4,888,505, Cl. 307-571.000.

Slomowitz, Harry, to Tegal Corporation. Ignitor for a microwave sustained plasma. 4,888,088, Cl. 156-643.000.

Smallwood, Malvern C., II. Photo-electromagnetic color separation for reproduction of color images. 4,888,611, Cl. 355-32.000.

Smed, Jan P.: *See*—
Mumford, Stephen E.; and Smed, Jan P., 4,887,432, Cl. 60-759.000.

Smet, Carlo. Arrangement for cleaning a steam generator with a water jet. 4,887,555, Cl. 122-382.000.

Smith Corona Corporation: *See*—
McRae, Doris J.; and Roberts, Richard E., 4,887,920, Cl. 400-63.000.
McRae, Doris J.; and Roberts, Richard E., 4,888,730, Cl. 364-900.000.

Smith, Dell W., to Bar-Master International. Valve for beverage dispenser and the like. 4,887,740, Cl. 222-129.100.

Smith, Frank T. J., to Eastman Kodak Company. Processes for their manufacture of monolithically integrated planar lasers differing in emission wavelengths. 4,888,085, Cl. 156-613.000.

Smith, Gerald J.; Trask, Elwood G.; Ellis, Paul; Johnston, Jon; Campbell, Brian; and Rorie, Leon, to Gates Formed-Fibre Products, Inc. Formable fiber composite. 4,888,234, Cl. 428-234.000.

Smith, Gerald V.: *See—*
Shiley, Richard H.; Hughes, Randall E.; Webster, John R.; Hinckley, Conrad C.; Smith, Gerald V.; and Wiltowski, Tomasz, 4,888,029, Cl. 44-622.000.

Smith, Kim R., to Ethyl Corporation. Process for preparing alkoxylated tertiary amines. 4,888,447, Cl. 564-480.000.

Smith, Lawrence N., to Microelectronics and Computer Technology Corporation. Customizable circuitry. 4,888,665, Cl. 361-400.000.

Smith Metal Arts Co., Inc.: *See—*
Pielechowski, Craig A.; and Panzarella, James S., 4,887,724, Cl. 211-11.000.

Smith, Royston R.: *See—*
Price, Timothy J.; and Smith, Royston R., 4,888,123, Cl. 252-135.000.

Smith, Terrence R.: *See—*
Isnardi, Michael A.; Smith, Terrence R.; Fuhrer, Jack S.; and Roeder, Barbara J., 4,888,641, Cl. 358-141.000.

SmithKline Beckman Corporation: *See—*
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,888,336, Cl. 514-278.000.

Smithy, Mary J.: *See—*
Phillips, Eddie; Harville, Dyle; Lee, Mildred; Kirby, Danny; Ellison, Kathleen; Smithy, Mary J.; McNutt, Eugene; Gholston, Yvonne; Brewer, Jim; and McClure, Charles, 4,887,774, Cl. 242-58.600.

Smyth, Robert W.: *See—*
Dunlop, John A.; Milner, Edward F. G.; Smyth, Robert W.; and Toop, Gerald W., 4,887,492, Cl. 75-77.000.

Snyder, Michael D.: *See—*
Soth, Henry J.; and Snyder, Michael D., 4,887,778, Cl. 226-109.000.

Snyder, Sherman M.; and Brown, Edgar E., to United Technologies Corporation. High strength cast+HIP nickel base superalloy. 4,888,253, Cl. 428-680.000.

Sobel, Jarl: *See—*
Kolavcic, Pavel; Sobel, Jarl; and Ornholmer, Lars, 4,887,471, Cl. 73-862.690.

Societe anonyme dite: Alcatel Cit: *See—*
Crinquette, Jean-Marie; and Long, Jacques, 4,887,941, Cl. 417-2.000.
Mousseaux, Daniel; Chevet, Bruno; and Grard, Emmanuel, 4,887,882, Cl. 350-96.200.

Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.): *See—*
Godfroid, Jean-Jacques; Heymans, Francoise; and Braquet, Pierre, 4,888,337, Cl. 514-326.000.
Godfroid, Jean-Jacques; and Braquet, Pierre, 4,888,338, Cl. 514-336.000.

Soffer, Bernard H.: *See—*
Marom, Emanuel; Owechko, Yuri; and Soffer, Bernard H., 4,888,724, Cl. 364-807.000.

Sogawa, Akira: *See—*
Shirakami, Toshiharu; and Sogawa, Akira, 4,887,614, Cl. 128-798.000.

Sohama, Yoshio: *See—*
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Sohn, Daniel D.: *See—*
Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., 4,888,356, Cl. 514-456.000.

Sohn, Sang H., to Goldstar Co., Ltd. Method of manufacturing an electroluminescence display device. 4,888,077, Cl. 156-285.000.

Soininen, Mauri, to Valmet Paper Machinery Jylhavaara OY. Air knife. 4,887,545, Cl. 118-63.000.

Solano, Victorino S.; and Trilla, Antonio S., to Pujol Y Tarrago, S. A. Automatic length adjuster for control cables, and control cable provided therewith. 4,887,705, Cl. 192-111.00A.

Solbrig, Christian: *See—*
Gamon, Norbert; Solbrig, Christian; and Braunsperger, Karl, 4,888,405, Cl. 528-23.000.

Solis S.R.L.: *See—*
Gazzarrini, Vinicio, 4,887,858, Cl. 294-1.100.

Somar Corporation: *See—*
Sumi, Sigeo, 4,888,080, Cl. 156-344.000.
Sumi, Sigeo; Hamamura, Fumio; and Fukuda, Ichio, 4,888,083, Cl. 156-521.000.

Sommer, Herbert; and Ruckert, Hans, to Jagenberg Aktiengesellschaft. Apparatus for continuously applying a uniform coating to a material web. 4,887,547, Cl. 118-410.000.

Sony Corporation: *See—*
Hirata, Shoji, 4,888,784, Cl. 372-46.000.
Ishibashi, Akira; Funato, Kenji; and Mori, Yoshifumi, 4,888,622, Cl. 357-5.000.
Kanaguchi, Masahiro; and Kawamoto, Hideo, 4,887,775, Cl. 242-68.100.
Kusakabe, Susumu, 4,888,643, Cl. 358-183.000.
Oda, Omasu; and Amano, Toshio, 4,888,819, Cl. 358-192.100.
Ohta, Teruo, 4,888,761, Cl. 369-291.000.
Tamaru, Hideshi, 4,888,479, Cl. 250-221.000.

Soth, Henry J.; and Snyder, Michael D., to Universal Instruments Corporation. Feeder drive assembly and replaceable section for tape supplying and cover peeling. 4,887,778, Cl. 226-109.000.

Soubrier, Pierre: *See—*
Rondeau, George; and Soubrier, Pierre, 4,887,411, Cl. 53-493.000.
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Southern Illinois University, The Board of Trustees of: *See—*
Shiley, Richard H.; Hughes, Randall E.; Webster, John R.; Hinckley, Conrad C.; Smith, Gerald V.; and Wiltowski, Tomasz, 4,888,029, Cl. 44-622.000.

Spaeth, Werner: *See—*
Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, 4,888,081, Cl. 156-359.000.

Spahn, James G.; Langley, Steven P.; and Jacobs, Michael L., to Ehob, Inc. Surgical gauze sponge manager. 4,887,715, Cl. 206-370.000.

Spairisano, Antonio P.; and Cellai, Marino, to SGS Microelettronica S.p.A. Method for manufacturing plastic encapsulated semiconductor devices. 4,888,307, Cl. 437-216.000.

Sparrow, James A.: *See—*
Gjertsen, Robert K.; Knott, Ronald P.; and Sparrow, James A., 4,888,151, Cl. 376-327.000.

Spatara, Joseph M.: *See—*
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Spears, Kenneth: *See—*
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Spector, George: *See—*
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Spenny, William E.: *See—*
Kosmo, Joseph J.; Tri, Terry O.; Spenny, William E.; and West, Philip R., 4,887,749, Cl. 223-111.000.

Spina, Paul: *See—*
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Spivey, William J., Jr.: *See—*
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Spohr, Horst, to Bautex Adolf Stover Sohne KG. Spacer for a vertical blind. 4,887,657, Cl. 160-178.100.

Stainton, John E.: *See—*
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Stamicarbon B.V.: *See—*
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Standard Oil Company, The: *See—*
Glaeser, Linda C.; Brazdil, James F., Jr.; and Toft, Mark A., 4,888,438, Cl. 558-319.000.
Quigley, Vincent P.; and Jorkasky, Richard J., II, 4,888,367, Cl. 524-17.000.

Stant Inc.: *See—*
Harris, Robert S., 4,887,733, Cl. 220-203.000.

Star Seimitsu Kabushiki Kaisha: *See—*
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Stark, Richard A.: *See—*
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Steel, Francis R., deceased: *See—*
Chanroo, Keith A.; and Steel, Francis R., deceased, 4,888,793, Cl. 375-84.000.

Steel, Lynne A., legal representative: *See—*
Chanroo, Keith A.; and Steel, Francis R., deceased, 4,888,793, Cl. 375-84.000.

Stefani, Fabrizio, to SGS-Thomas Microelectronics S.r.L. Audio amplifier having a low-noise input stage. 4,888,563, Cl. 330-296.000.

Steidle, Werner, to Kolbenschmidt Aktiengesellschaft. Expansion-controlled light alloy piston. 4,887,519, Cl. 92-228.000.

Stein, Judith; and Leonard, Tracey M., to General Electric Company. Shelf stable silicone caulking materials. 4,888,382, Cl. 524-788.000.

Steiner, Thomas L.; Minnick, Dana T.; Domeshek, Kenneth A.; and Lester, Donald H., Jr., to Celanese Fibers, Inc. Water soluble cellulose acetate microspheres. 4,888,420, Cl. 536-64.000.

Sterling Drug Inc.: *See—*
Bailey, Denis M.; and Kumar, Virendra, 4,888,352, Cl. 514-406.000.

Sterling Plumbing Group, Inc.: *See—*
Marlowe, James L., 4,887,394, Cl. 49-409.000.

Stetter, Joseph R.: *See—*
Zaromb, Solomon; and Stetter, Joseph R., 4,888,295, Cl. 436-161.000.

Stevens, James F., Jr., to Texaco, Inc. Fracturing with a mixture of carbon dioxide and alcohol. 4,887,671, Cl. 166-308.000.

Stewart, Jack; and Lowe, Jim. Automatic flame snuffer assembly. 4,887,960, Cl. 431-146.000.

Stewart, Ray F.: *See—*
Nyberg, Eric D.; Klingman, Ken A.; Curtis, Jeff; and Stewart, Ray F., 4,888,098, Cl. 204-1.00R.

Still, Donald O.; and Burley, George J., to Bridgestone/Firestone, Inc. Stabilizer ply trimmer. 4,887,501, Cl. 82-54.000.

Stitz, David G., to Stitz, David G. Radiant heating panels. 4,888,472, Cl. 219-548.000.

Stokar, Saul: *See—*
Egozi, Avihai; and Stokar, Saul, 4,888,552, Cl. 324-309.000.

Stokes, R. W. Portable dual umbrella holder. 4,887,786, Cl. 248-512.000.

Stork Brabant B.V.: *See—*
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Stormberg, Hans-Peter: *See—*
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Strader, Judith D. Composition for making permanent impressions. 4,888,377, Cl. 524-425.000.

Strait, Clifford C., Jr. Circuit protection device. 4,888,797, Cl. 379-438.000.

Strate, Klaus: *See*—
Fricke, Herbert; Strate, Klaus; Wilmes, Manfred; and Frikkee, Arian, 4,887,876, Cl. 350-96.200.

Strathman, Lyle R.: *See*—
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Streamlight, Inc.: *See*—
Sharrah, Raymond L., 4,888,670, Cl. 362-205.000.

Streicher, Rolf: *See*—
Ebel, Klaus; Reuther, Wolfgang; Fikentscher, Rolf; Lach, Dietrich; Streicher, Rolf; and Schaffer, Ortwin, 4,888,412, Cl. 528-230.000.

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Striegler, Hellmut: *See*—
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Strippgen, Walter E.: *See*—
Heinig, Charles F.; Asher, Marc A.; and Strippgen, Walter E., 4,887,595, Cl. 506-61.000.

Stroech, Klaus; Frie, Monika; Bockmann, Klaus; Lurssen, Klaus; and Dutzmann, Stefan, to Bayer Aktiengesellschaft. Fungicidal and plant growth-regulating azolyl-tetrahydropyran derivatives. 4,888,048, Cl. 71-92.000.

Strohl, Clair L., Jr.: *See*—
Lederman, David M.; Singh, Param I.; and Strohl, Clair L., Jr., 4,888,009, Cl. 623-2.000.

Struger, Odo J.; and Sammons, Barry E., to Allen-Bradley Company. Inc. Distributed processing in a cluster of industrial controls linked by a communications network. 4,888,726, Cl. 364-900.000.

Stumpf, Friedrich, to Indag Gesellschaft fur Industriebedarf m.b.H. Stand-up bag. 4,887,912, Cl. 383-66.000.

Stutz, William A.; Kiss, Laszlo A.; and Rizzi, Joseph D., to Alto Technology. Photograph processing method and apparatus. 4,888,607, Cl. 354-323.000.

Suenaga, Haruo: *See*—
Takano, Teruhisa; Kurita, Hitoshi; Fujii, Yasuteru; Suenaga, Haruo; and Yano, Masashi, 4,888,461, Cl. 219-10.55B.

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Sugimoto, Haruhide: *See*—
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Sugimoto, Masaki; Hitomi, Nobuteru; Ikeura, Kenji; Hirano, Hiroyuki; Morikawa, Kunihiko; Kitahara, Hisashi; and Takatori, Kazuhiro, to Nissan Motor Co., Ltd. Magnetostriction type torque sensor. 4,887,461, Cl. 73-118.100.

Sugimoto, Noritsugu; Mori, Nobuyuki; Nakamura, Shozi; and Wada, Fusazo. Food-packaging material and process for preparing the same. 4,888,223, Cl. 428-34.900.

Sugiura, Fumihiko: *See*—
Umeda, Tetsuo; and Sugiura, Fumihiko, 4,888,646, Cl. 358-464.000.

Sugiyama, Jun: *See*—
Wada, Akihiro; Kakuta, Rin-ichi; Ohuchi, Kenji; Sugiyama, Jun; and Hasegawa, Shinji, 4,888,387, Cl. 525-66.000.

Sugiyama, Tsutomu; and Yoshizumi, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha. Hydraulic control valve apparatus. 4,887,511, Cl. 91-361.000.

Sugiyama, Tuyoshi; Takeda, Hideo; Sato, Tsunehiko; and Chikamasa, Hiroshi, to Fuji Photo Film Co., Ltd. Apparatus for removing particles from a flexible support. 4,887,623, Cl. 134-64.00R.

Suichi, Isao: *See*—
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa, 4,887,662, Cl. 164-427.000.

Sukimoto, Minobu; Yamazaki, Katsumi; Hirunuma, Naohisa; Taguchi, Seijiro; Usui, Tadashi; Akiyoshi, Yasushi; Nogami, Toyoichiro; and Kaneko, Toyoji, to Showa Aluminum Corporation. Process for producing an intake manifold. 4,887,557, Cl. 123-52.0MC.

Sullivan, Carole: *See*—
Kortright, Kenneth H.; Hofheinz, David E.; Sullivan, Carole; and Toedter, Gary P., 4,888,290, Cl. 435-240.270.

Sullivan, Donald F., to M & T Chemicals Inc. Photoprinting process and apparatus for exposing paste consistency photopolymers. 4,888,270, Cl. 430-325.000.

Sullivan, James C.: *See*—
Epperly, William R.; and Sullivan, James C., 4,888,165, Cl. 423-235.000.

Sullivan, Robert A.: *See*—
Gerken, Kenneth F.; and Sullivan, Robert A., 4,888,702, Cl. 364-494.000.

Sulzer Brothers Limited: *See*—
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van Mullekom, Hubert P., 4,887,649, Cl. 139-450.000.

Sulzer-Escher WYSS GmbH: *See*—
Weisshuhn, Elmer; Bubik, Alfred; Dahl, Hans; Holik, Herbert; Kurtz, Rudiger; Zembrot, Anton; Stotz, Wolf-Gunter; Seider, Werner; and Trondle, Robert, 4,888,094, Cl. 162-198.000.

Sumi, Sigeo, to Somar Corporation. Projected press device for raising film. 4,888,080, Cl. 156-344.000.

Sumi, Sigeo; Hamamura, Fumio; and Fukuda, Ichio, to Somar Corporation. Laminator. 4,888,083, Cl. 156-521.000.

Sumimoto, Shinzaburo; Ishizuka, Ichiro; Ueda, Shiro; Kai, Hiroyuki; and Ide, Kinya, to Shionogi & Co., Ltd. 3-perfluoroalkyl-5-substituted-oxy-isoxazole derivatives, process for preparing the same, and herbicides containing the same. 4,888,044, Cl. 71-88.000.

Sumitomo Chemical Company, Limited: *See*—
Arai, Kenji; Morita, Kouichi; Mito, Nobuaki; and Hirata, Naonori, 4,888,042, Cl. 71-88.000.
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,888,045, Cl. 71-90.000.
Haga, Toru; Nagano, Eiki; Sato, Ryo; and Morita, Kouichi, 4,888,428, Cl. 548-165.000.
Yasuhisa, Saito; Kamio, Kunimasa; Shibata, Mitsuhiro; Watanabe, Katsuya; Shiomi, Yutaka; and Ueda, Youichi, 4,888,407, Cl. 525-423.000.

Sumitomo Electric Industries, Ltd.: *See*—
Kato, Chiaki; Nishi, Masaya; and Hatta, Toshiyuki, 4,887,340, Cl. 29-130.000.

Sumitomo Pharmaceuticals Company, Limited: *See*—
Sunagawa, Makoto; Isobe, Yutaka; Takeuchi, Yutaka; Matsumura, Haruki; Ozaki, Yukio; and Noguchi, Tetsuo, 4,888,344, Cl. 514-210.000.

Summers, John K., to Better Life International, Inc. Composition and method to provide organoleptic bite in a composition for human consumption. 4,887,620, Cl. 131-352.000.

Sun, Jung-Hui: *See*—
Lednicer, Daniel; and Sun, Jung-Hui, 4,888,353, Cl. 514-422.000.

Sunagawa, Makoto; Isobe, Yutaka; Takeuchi, Yutaka; Matsumura, Haruki; Ozaki, Yukio; and Noguchi, Tetsuo, to Sumitomo Pharmaceuticals Company, Limited. Carbapenem compound in crystalline form, and its production and use. 4,888,344, Cl. 514-210.000.

Sundeen, Joseph E.; Floyd, David; and Lee, Ving G., to E. R. Squibb & Sons, Inc. ACE-diuretics. 4,888,424, Cl. 544-288.000.

Sundhar, Shaam P. Electric socket adapter. 4,888,678, Cl. 363-146.000.

Sundquist, Robert S.; and McBride, Thomas S., to Allied-Signal Inc. Loran-C receiver module. 4,888,594, Cl. 342-389.000.

Sundstrand Corporation: *See*—
Fluegel, Theodore D., 4,888,493, Cl. 290-4.00C.
Griffey, Edwin K., 4,887,479, Cl. 74-424.8NA.
Russ, David E., 4,887,490, Cl. 74-844.000.

Susini, Etienne; and Soubrier, Pierre, to Baxter International Inc. Conforming device for a flexible film provided with projecting mouthpieces. 4,887,973, Cl. 493-213.000.

Susukida, Masato: *See*—
Yamazaki, Shunpei; Suzuki, Kunio; Nagayama, Susumu; Inujima, Takashi; Abe, Masayoshi; Fukada, Takeshi; Kinka, Mikio; Kobayashi, Ippei; Shibata, Katsuhiko; Susukida, Masato; and Koyanagi, Kaoru, 4,888,305, Cl. 437-101.000.

Suyama, Tadakazu: *See*—
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Suzuki, Akiyoshi; Ina, Hideki; and Kosugi, Masao, to Canon Kabushiki Kaisha. Observation system for a projection exposure apparatus. 4,888,614, Cl. 355-43.000.

Suzuki, Hiroko: *See*—
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, 4,888,271, Cl. 430-328.000.

Suzuki, Kunio: *See*—
Yamazaki, Shunpei; Suzuki, Kunio; Nagayama, Susumu; Inujima, Takashi; Abe, Masayoshi; Fukada, Takeshi; Kinka, Mikio; Kobayashi, Ippei; Shibata, Katsuhiko; Susukida, Masato; and Koyanagi, Kaoru, 4,888,305, Cl. 437-101.000.

Suzuki, Masamichi; Sano, Tadaaki; Suzuki, Toshihiro; and Tanaka, Tsunehiko, to Alcan International Limited. Process for applying a zinc coating to an aluminum article. 4,888,218, Cl. 427-383.900.

Suzuki, Masaru, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Vehicle turn signal cancelling device. 4,888,456, Cl. 200-61.270.

Suzuki, Satoshi, to Yamaha Corporation. Automatic accompaniment apparatus for electronic musical instrument. 4,887,503, Cl. 84-613.000.

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Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Saneshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.

Suzuki, Shosuke: *See*—
Ishiwaka, Takumi; Andoh, Yukio; Yamaguchi, Michiyuki; Suzuki, Shosuke; Egashira, Yoshinori; Yokobori, Takeo; and Ohashi, Takashi, 4,887,923, Cl. 400-659.000.

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Suzuki, Toshihiro: *See*—
Suzuki, Masamichi; Sano, Tadaaki; Suzuki, Toshihiro; and Tanaka, Tsunehiko, 4,888,218, Cl. 427-383.900.

Suzuki, Yasuaki: *See*—
Takeuchi, Ryozo; Suzuki, Yasuaki; Nagata, Tetsuya; and Hirose, Eturo, 4,888,648, Cl. 358-335.000.

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Suzuki, Yasuo: *See*—
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,888,683, Cl. 364-200.000.
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,888,332, Cl. 514-206.000.

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Svennerholm, Lars T.: *See*—
Holmgren, Jan R.; Lindholm, Leif Gustav; and Svennerholm, Lars T., 4,888,275, Cl. 435-7.000.

Swank, Ronald W.: *See*—
Posey, John L.; and Swank, Ronald W., 4,888,155, Cl. 422-49.000.

Swanson, Douglas J.: *See*—
Fischer, Richard J.; and Swanson, Douglas J., 4,887,788, Cl. 248-562.000.

Sway-Tin, Min; Merchant, Daniel P.; and Mangliers, Thomas J., to Chrysler Motors Corporation. Multiple semiconductor heat sink-/mounting assembly. 4,888,637, Cl. 357-81.000.

Sybel, Randall T.: *See*—
George, Paul L.; Waxman, David M.; Sybel, Randall T.; Mednick, Elliot H.; O'Brien, Kevin J.; and Spatara, Joseph M., 4,888,691, Cl. 364-300.000.

Syntex (U.S.A.) Inc.: *See*—
Huguet, Joan; Muchowski, Joseph M.; and Lara, Maria T., 4,888,358, Cl. 514-530.000.

Synthes (U.S.A.): *See*—
Sherman, Michael, 4,887,596, Cl. 606-61.000.

Syntrall Canada Inc.: *See*—
Alles, Anthony, 4,887,999, Cl. 604-110.000.

System Schultheis AG: *See*—
Greub, Bruno A., 4,887,953, Cl. 414-331.000.

Szczygielski, Thomas J.: *See*—
Barnes, Cherie C.; Bennett, Robert B.; and Szczygielski, Thomas J., 4,888,681, Cl. 364-200.000.

Szebenyi, Emil; and Kuslima, Shogen, to Alfaceu Corporation. Pharmaceutical for treating tumors and methods for making it. 4,888,172, Cl. 424-105.000.

Tabata, Mamoru: *See*—
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.

Tabata, Masaaki, to Toyota Jidosha Kabushiki Kaisha. Hydraulic cylinder apparatus. 4,887,515, Cl. 92-80.000.

Tada, Tetsuo; and Matsui, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor test system. 4,888,715, Cl. 364-550.000.

Tada, Yoshihiko: *See*—
Nishii, Michiharu; Mizuno, Genji; Tada, Yoshihiko; Nomura, Yoshihisa; Kato, Masahiko; Shirai, Kenji; and Tanoue, Junichi, 4,887,869, Cl. 30? '4.000.

Taguchi, Seijiro: *See*—
Sukimoto, Minot- .mazaki, Katsumi; Hirunuma, Naohisa; Taguchi, Seijiro; Ur- adashi; Akiyoshi, Yasushi; Nogami, Toyoichiro; and Kaneko, Toyoji, 4,887,557, Cl. 123-52.0MC.

Taguchi, Tetsuya: *See*—
Konno, Akira; Taguchi, Tetsuya; and Yamaguchi, Takenobu, 4,888,193, Cl. 426-549.000.

Tahara, Akinori: *See*—
Enomoto, Hiromu; Yasuda, Yasushi; Shimauchi, Yoshiki; and Tahara, Akinori, 4,888,623, Cl. 357-15.000.

Tajima, Kenji; Tsuboi, Tetsuo; and Arata, Ryozo, to Adeka Argus Chemical Co., Ltd. Bis(2,6-dis-tert-butyl-4-branched propyl or butyl phenyl)-pentaerythritol spiro phosphites and synthetic resin compositions containing such phosphites. 4,888,371, Cl. 524-120.000.

Tajima, Noriyasu; Michio, Suzuki; and Mihara, Hidemi, to Tokyo Electric Co., Ltd. Apparatus for processing contents of totalizing memories in electronic balance assembly. 4,888,700, Cl. 364-466.000.

Takahashi, Hiroshi, to Nissan Motor Company, Limited. System and method for controlling a mixture ratio of air-fuel mixture supplied to an internal combustion engine. 4,887,575, Cl. 123-435.000.

Takahashi, Ken-ichiroh; Inaba, Ritsuo; Sugano, Nobukazu; Harao, Horiyuki; Matsuyama, Yukihiro; Tanoue, Hiromi; and Kishi, Toru, to Matsushita Electric Industrial Co., Ltd. Driving apparatus for ultrasonic motor. 4,888,514, Cl. 310-316.000.

Takahashi, Masaharu; and Yoshida, Takeo, to Shin-Etsu Chemical Co., Ltd. Silicone rubber composition. 4,888,374, Cl. 524-227.000.

Takahashi, Shogo: *See*—
Omura, Etsuji; Goto, Katsuhiko; Takahashi, Shogo; Namba, Harumi; and Takemoto, Akira, 4,888,781, Cl. 372-46.000.

Takai, Haruko: *See*—
Shiozawa, Kouji; Takai, Haruko; Takatsuna, Kazutoshi; Okamoto, Nobukazu; Okumura, Yoshiharu; and Imai, Chihiro, 4,888,436, Cl. 556-413.000.

Takami, Tetuji; Tsubota, Hiroyki; and Ochi, Hisashi, to Iatron Laboratories, Inc.; and Unitaka Ltd. Reagent for determining creatine kinase. 4,888,289, Cl. 435-15.000.

Takamura, Koji: *See*—
Yabe, Hisao; and Takamura, Koji, 4,888,639, Cl. 358-98.000.

Takamura, Yoshiyuki, to Fuji Pack Systems, Ltd. Wrapping machine. 4,887,412, Cl. 53-504.000.

Takano, Teruhisa; Kurita, Hitoshi; Fujii, Yasuteru; Suenaga, Haruo; and Yano, Masashi, to Matsushita Electric Industrial Co., Ltd. High-frequency heating apparatus. 4,888,461, Cl. 219-10.55B.

Takarada, Mitsuhiro: *See*—
Ohsugi, Hiroharu; Eguchi, Yoshio; Urano, Satoshi; Mizuguchi, Ryuzo; and Takarada, Mitsuhiro, 4,888,406, Cl. 528-32.000.

Takasago International Corporation: *See*—
Matsuda, Hiroyuki; and Yamamoto, Takeshi, 4,888,323, Cl. 512-23.000.

Takasaki, Yukio: *See*—
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Takashi Makino, to Yamaha Corporation. Loudspeaker device. 4,888,811, Cl. 381-111.000.

Takatori, Kazuhiro: *See*—
Sugimoto, Masaki; Hitomi, Nobuteru; Ikeura, Kenji; Hirano, Hiroyuki; Morikawa, Kunihiko; Kitahara, Hisashi; and Takatori, Kazuhiro, 4,887,461, Cl. 73-118.100.

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Shiozawa, Kouji; Takai, Haruko; Takatsuna, Kazutoshi; Okamoto, Nobukazu; Okumura, Yoshiharu; and Imai, Chihiro, 4,888,436, Cl. 556-413.000.

Takeda Chemical Industries, Ltd.: *See*—
Konno, Akira; Taguchi, Tetsuya; and Yamaguchi, Takenobu, 4,888,193, Cl. 426-549.000.

Takeda, Hideo: *See*—
Sugiyama, Tuyoshi; Takeda, Hideo; Sato, Tsunehiko; and Chikamasa, Hiroshi, 4,887,623, Cl. 134-64.00R.

Takegawa, Katumi: *See*—
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Takei, Toshio; and Tanaka, Toshio, to Dainippon Ink and Chemicals, Inc. Process for producing dimethylaminomethyl copper phthalocyanine and/or its derivatives. 4,888,422, Cl. 540-135.000.

Takei, Yoshiaki: *See*—
Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,888,262, Cl. 430-58.000.

Takeishi, Shinzo: *See*—
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Takemoto, Akira: *See*—
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Taketomi, Seiki: *See*—
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Taketoshi, Kazuhisa: *See*—
Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,888,521, Cl. 313-366.000.

Takeuchi, Ryozo; Suzuki, Yasuaki; Nagata, Tetsuya; and Hirose, Eturo, to Hitachi, Ltd. Electronic album. 4,888,648, Cl. 358-335.000.

Takeuchi, Tatsuo, to Canon Kabushiki Kaisha. Image fixing roller and image fixing apparatus using same. 4,887,964, Cl. 432-60.000.

Takeuchi, Tomio: *See*—
Kawai, Hiroyuki; Nakajima, Shohachi; and Takeuchi, Tomio, 4,888,418, Cl. 536-6.400.

Takeuchi, Yutaka: *See*—
Sunagawa, Makoto; Isobe, Yutaka; Takeuchi, Yutaka; Matsumura, Haruki; Ozaki, Yukio; and Noguchi, Tetsuo, 4,888,344, Cl. 514-210.000.

Takeyama, Yoshinobu, to Ricoh Company, Ltd. Semiconductor laser control apparatus. 4,888,777, Cl. 372-38.000.

Takimoto, Hiroyuki: *See*—
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Takizawa, Shozo: *See—*
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; Wada, Shunichi; and Ohtagaki, Shigeki, 4,887,840, Cl. 280-707.000.
Tanaka, Tadao; Mitsui, Takeshi; Takizawa, Shozo; and Fukuyama, Kazuo, 4,887,632, Cl. 137-117.000.
Talson Transport Engineering B.V.: *See—*
Thunnissen, Kees W., 4,887,937, Cl. 414-527.000.
Tam, Kwok C., to General Electric Company. Method to obtain object boundary information in limited-angle computerized tomography. 4,858,693, Cl. 364-413.160.
Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, to Konica Corporation. Image forming method. 4,888,262, Cl. 430-58.000.
Tamaru, Hideshi, to Sony Corporation. Touch panel apparatus. 4,888,479, Cl. 250-221.000.
Tamhankar, Satish S.: *See—*
Bandyopadhyay, Nikhiles; Tamhankar, Satish S.; and Kirschner, Mark J., 4,888,037, Cl. 65-32.200.
Tamminen, Pentti J. Alkalline cell battery and method for manufacture thereof. 4,887,348, Cl. 29-623.200.
Tamura, Masayuki: *See—*
Hayashi, Kenrou; Oguma, Reiji; and Tamura, Masayuki, 4,888,142, Cl. 264-65.000.
Tamura, Shuichi, to Canon Kabushiki Kaisha. Rotary power unit. 4,888,515, Cl. 310-323.000.
Tanabe Seiyaku Co., Ltd.: *See—*
Kubo, Masami; Ochiai, Takashi; and Yuasa, Hirofumi, 4,888,339, Cl. 514-392.000.
Tanaka, Hidehiko: *See—*
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Tanaka, Hideshi: *See—*
Wakasugi, Tomio; and Tanaka, Hideshi, 4,888,701, Cl. 364-482.000.
Tanaka, Hironori; and Shirakoshi, Hiroshi, to Sharp Kabushiki Kaisha. Paper transport system for apparatus including facsmile and photocopying machines. 4,887,806, Cl. 271-121.000.
Tanaka Kogyo Co., Ltd.: *See—*
Yokoyama, Yukio, 4,887,476, Cl. 74-7.00E.
Tanaka, Shigenori; Itoh, Yasuo; Hayashida, Michiya; Hara, Kenichi; Yamamoto, Keiichi; Itani, Hikotaro; Yamane, Atsumu; Kasama, Akio; Suichi, Isao; Kajioka, Hiroyuki; and Sasaki, Kunimasa. Cooling drum for continuous-casting machines for manufacturing thin metallic strip. 4,887,662, Cl. 164-427.000.
Tanaka, Shigeo: *See—*
Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.
Tanaka, Shinichi: *See—*
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Tanaka, Tadao; Mitsui, Takeshi; Takizawa, Shozo; and Fukuyama, Kazuo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Flow control apparatus. 4,887,632, Cl. 137-117.000.
Tanaka, Tadao: *See—*
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Tanaka, Tsunehiko: *See—*
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Tandem Computers Incorporated: *See—*
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Tangari, Celia M.; Dugast, Alain; and Abriou, Daniel, to Saint-Gobain Emballage. Moulds for glass making and use thereof. 4,887,791, Cl. 249-115.000.
Tanigawa, Shigeho: *See—*
Tokunaga, Masaaki; Endoh, Minoru; Meguro, Noriaki; and Tanigawa, Shigeho, 4,888,068, Cl. 148-104.000.
Tanigawa, Takaho, to NEC Corporation. Testing circuit for random access memory device. 4,888,772, Cl. 371-21.200.
Taniguchi, Hiroo: *See—*
Sawaragi, Fujio; and Taniguchi, Hiroo, 4,888,434, Cl. 556-418.000.
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Tanioka, Kenkichi; Shidara, Keiichi; Kawamura, Tatsuro; Yamazaki, Junichi; Hiruma, Eikyuu; Taketoshi, Kazuhisa; Suzuki, Shiro; Yamashita, Takashi; Kosugi, Mitsuo; Ikeda, Yochizumi; Aiba, Masaaki; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, to Hitachi Ltd.; and Nippon Hoso Kyokai. Photoconductive device and method of operating the same. 4,888,521, Cl. 313-366.000.
Tannenbaum, Eli; Burgess, Trevor; Kalessidis, Vassilios; Orban, Andre; Williams, John; and Zanker, Klaus, to Anadrill, Inc. Measurement system and method for quantitatively determining the concentrations of a plurality of gases in drilling mud. 4,887,464, Cl. 73-153.000.
Tanoue, Hiromi: *See—*
Takahashi, Ken-ichiroh; Inaba, Ritsuo; Sugano, Nobukazu; Harao, Horiyuki; Matsuyama, Yukihiro; Tanoue, Hiromi; and Kishi, Toru, 4,888,514, Cl. 310-316.000.
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Taurus Holdings, Inc.: *See—*
Groswith, Charles T., III; and Seipp, Edwin A., III, 4,887,925, Cl. 402-15.000.
Taylor, Lloyd D.: *See—*
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Taylor, Lundy S., Jr. Fluid fill valve for fluid inflatable chambers and toilet tanks. 4,887,633, Cl. 137-225.000.
Taylor, Michael D.; Maier, Robert M.; Begley, Michael J.; Zmyslowski, Allan J.; Thomas, Jeffrey A.; and Petolino, Joseph A., to Amdahl Corporation. Apparatus and method for improving cache access throughput in pipelined processors. 4,888,689, Cl. 364-200.000.
Taylor, Richard H., to Microtek Medical Inc. Sterile drape for ultrasound probe. 4,887,615, Cl. 128-850.000.
Taylor, William M.: *See—*
Chin, Arthur H.; and Taylor, William M., 4,887,846, Cl. 285-18.000.
Tazaki, Seiji: *See—*
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TDK Corporation: *See—*
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Tegal Corporation: *See—*
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Teichner, Marshall I., to Minatur Promotions and Enterprises, Ltd. Self-contained, collapsible demonstration table with a backboard, for use in product demonstrations. 4,887,536, Cl. 108-35.000.
Tektronix, Inc.: *See—*
Castagnozzi, Daniel M., 4,888,588, Cl. 341-122.000.
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Kooi, J. Peter E.; and Myers, James W., Jr., 4,887,448, Cl. 72-344.000.
Peterson, John M., 4,887,397, Cl. 52-86.000.
Tenconi, Riccardo, to MEC-MOR S.p.A. Process for manufacturing a semi-finished item for the production of briefs with a circular knitting machine. 4,887,439, Cl. 66-51.000.
Tencza, Thomas M.: *See—*
Jones, Howard; Lukacsko, Alison B.; Tencza, Thomas M.; Sarsfield, Beth A.; and Patel, Mahesh K., 4,888,343, Cl. 514-264.000.
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Teranishi, Akio; Genji, Nobuo; and Itoh, Kohji, to Matsushita Electric Industrial Co., Ltd. Transmitting and receiving systems. 4,888,788, Cl. 375-1.000.
Terasaka, Teiji: *See—*
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Terpstra, Larry J.; and Babel, William R., to Allied-Signal Inc. Electronic torquer interface and erection control circuit. 4,888,540, Cl. 318-689.000.
Terry, Brian K.; Hall, Steven D.; and McDermott, Robert J., to Motorola, Inc. Battery charger. 4,888,544, Cl. 320-37.000.
Terui, Yasuaki, to Matsushita Electric Industrial Company, Ltd. Charge transfer device having a buried transfer channel with higher and lower concentrations. 4,888,633, Cl. 357-24.000.
Tesch, Charles V. Patient positioning apparatus. 4,887,325, Cl. 5-84.000.
Tetra Pak Finance & Trading S.A.: *See—*
Rausing, Hans, 4,887,765, Cl. 229-123.200.
Texaco Chemical Co.: *See—*
Klein, Howard P.; and Cuscurida, Michael, 4,888,446, Cl. 564-478.000.
Texaco, Inc.: *See—*
Stevens, James F., Jr., 4,887,671, Cl. 166-308.000.
Texas Instruments Incorporated: *See—*
Adams, Anthony L., 4,887,352, Cl. 29-827.000.
Bishop, Robert P., 4,888,662, Cl. 361-283.000.
Chen, Ih-Chin; Shen, Bing W.; Bohlman, James G.; and Tsai, Hun-Lian, 4,888,820, Cl. 361-313.000.
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Paterson, James L., 4,888,630, Cl. 357-23.500.
Reid, Lee R., 4,888,550, Cl. 324-158.00P.

Texmark Enterprises, Inc.: *See—*
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Textron, Inc.: *See—*
Gast, Robert L.; and Willits. Lyle V., 4,887,450, Cl. 72-391.000.
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Thermo Blender Inc.: *See—*
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Thomas A. Schutz Co., Inc.: *See—*
Adenau, Marvin L., 4,887,737, Cl. 221-3.000.
Thomas, Alvin R. Power tool attachment for table saws. 4,887,653, Cl. 144-286.00R.
Thomas, Bryan: *See—*
Easton, Thomas; and Thomas, Bryan, 4,888,107, Cl. 208-188.000.
Thomas, Frank, to U.S. Golf Association. Turf gauge for measuring the hardness of a gold green. 4,887,459, Cl. 73-81.000.
Thomas, Gerald S.: *See—*
Worby, Donald; and Thomas, Gerald S., 4,887,944, Cl. 417-490.000.
Thomas Jefferson University: *See—*
Zeiger, Allen R., 4,888,279, Cl. 435-7.000.
Thomas, Jeffrey A.: *See—*
Taylor, Michael D.; Maier, Robert M.; Begley, Michael J.; Zmyslowski, Allan J.; Thomas, Jeffrey A.; and Petolino, Joseph A., 4,888,689, Cl. 364-200.000.
Thomas, Robert M., to Chrysler Motors Corporation. Self-retained one-piece pivot bushing. 4,887,331, Cl. 16-2.000.
Thompson, Kevin D.; and Ballard, Gary W., to Carrier Corporation. Limit switch control method for a two-stage furnace. 4,887,767, Cl. 236-1.0EB.
Thomsen, Leon A., to Amoco Corporation. Method of seismic surveying for resolving the effects of formation anisotropy in shear wave reflection seismic data. 4,888,743, Cl. 367-75.000.
Thomson Brandt: *See—*
Lacotte, Jean-Pierre; and Puech, Claude, 4,888,266, Cl. 430-141.000.
Thomson-CSF: *See—*
Bertalan, Philippe, 4,887,346, Cl. 29-600.000.
Brechard, Dominique; and Laurent, Pierre-Andre, 4,888,778, Cl. 371-37.400.
Thorax, Didier; and Marotel Gerard, to Compagnie D'Electronique et de Piezo-Electricite C.E.P.E. An improvement in a device for high accuracy thermal regulations of an enclosure. 4,888,471, Cl. 219-501.000.
Thunnissen, Kees W., to Talson Transport Engineering B.V. Load carrying floor. 4,887,937, Cl. 414-527.000.
Tichenor, George J. W.: *See—*
Reimschuessel, Herbert K.; Chiang, William G.; and Tichenor, George J. W., 4,888,396, Cl. 525-379.000.
Tieben, James B. Animal trap. 4,887,381, Cl. 43-66.000.
Timex Corporation: *See—*
Plancon, Michel; and Bertrix, Michel, 4,888,507, Cl. 310-40.0MM.
Schwartz, Herbert; and Wuthrich, Paul, 4,888,749, Cl. 368-157.000.
Ting, Albert C.; Willis, Timothy R.; Christ, F. Richard; Bacich, Steven R.; Pettit, Dean K.; Van Gent, Stanley L.; and Day, Jeffrey C., to Allergan, Inc. Haptic to optic attachment for a soft iol. 4,888,013, Cl. 623-6.000.
Tinley, Raymond K. Apparatus for relieving strain on electrical lead. 4,888,572, Cl. 336-65.000.
Tipping, David L.: *See—*
Plummer, Steven J.; Ina, Antoine; Tipping, David L.; and Esser, Peter D., 4,888,486, Cl. 250-363.040.
Tischer, Martine. Money tree. 4,888,221, Cl. 428-18.000.
TIW Systems, Inc.: *See—*
Deal, Joseph H., 4,888,769, Cl. 370-50.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Shiozawa, Kouji; Takai, Haruko; Takatsuna, Kazutoshi; Okamoto, Nobukazu; Okumura, Yoshiharu; and Imai, Chihiro, 4,888,436, Cl. 556-413.000.
Tobol, Nathan: *See—*
Hatfield, Walter B.; Tobol, Nathan; and Scholl, Frederick W., 4,888,763, Cl. 370-85.200.
Toda, Haruhisa, to Mitsubishi Denki Kabushiki Kaisha. Circuit breaker. 4,888,570, Cl. 335-167.000.
Todoroki, Yasumasa; Miura, Haruo; and Ohashi, Shigenobu, to Hitachi, Ltd. Multistage fluid machine. 4,887,940, Cl. 415-199.100.
Toedter, Gary P.: *See—*
Kortright, Kenneth H.; Hofheinz, David E.; Sullivan, Carole; and Toedter, Gary P., 4,888,290, Cl. 435-240.270.
Toft, Mark A.: *See—*
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Toguri, James: *See—*
Harris, Ralph; Toguri, James; and Wraith, Albert, 4,888,052, Cl. 75-20.00R.
Tohda, Takao: *See—*
Kuwata, Jun; Fujita, Yosuke; Tohda, Takao; Abe, Atsushi; and Matsuoka, Tomizo, 4,888,246, Cl. 428-432.000.
Toide, Eiichi: *See—*
Shikama, Shinsuke; Toide, Eiichi; Kondou, Mitsushige; and Iwata, Kazuo, 4,888,760, Cl. 369-122.000.
Tokai Carbon Co., Ltd.: *See—*
Nakada, Toshio; Takemura, Fumio; and Ishiwata, Masao, 4,888,215, Cl. 427-215.000.
Tokai Rubber Industries, Ltd.: *See—*
Igarashi, Ichiro; Ito, Hiroaki; and Nishimura, Kazuhiko, 4,887,647, Cl. 138-126.000.
Tokuda, Hiroatsu: *See—*
Arai, Nobukatsu; Sekine, Yoshihito; Osawa, Tadao; Tokuda, Hiroatsu; Usui, Toshifumi; and Tsutsui, Mitsukuni, 4,887,577, Cl. 123-494.000.
Tokunaga, Masaaki; Endoh, Minoru; Meguro, Noriaki; and Tanigawa, Shigeho, to Hitachi Metals, Ltd. Process for manufacturing permanent magnet. 4,888,068, Cl. 148-104.000.
Tokyo Electric Co., Ltd.: *See—*
Tajima, Noriyasu; Michio, Suzuki; and Mihara, Hidemi, 4,888,700, Cl. 364-466.000.
Tokyo Juki Industrial Co., Ltd.: *See—*
Satake, Atsushi; and Hirose, Hajime, 4,887,922, Cl. 400-637.000.
Tokyo Nagai Co., Ltd.: *See—*
Nagai, Yoshihiro, 4,887,845, Cl. 283-81.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Komatsu, Shigeru; and Inoue, Hiroshi, 4,888,306, Cl. 437-162.000.
Tolkoff, Marc J.: *See—*
Mohl, Werner; and Tolkoff, Marc J., 4,887,608, Cl. 128-673.000.
Tomasek, Jaroslav. Brushless servo motor construction and alignment. 4,888,509, Cl. 310-42.000.
Tomida, Masahito: *See—*
Kambayashi, Makoto; Nakatani, Kensuke; Ozaki, Kazuaki; Tomida, Masahito; Haraguchi, Hiroshi; and Hamamatsu, Takeo, 4,887,349, Cl. 29-623.500.
Tominaga, Akira: *See—*
Masubuchi, Yoichi; Watanabe, Tadashi; Tominaga, Akira; Nagaoka, Haruo; Nakatani, Eisaku; and Kume, Masafumi, 4,888,244, Cl. 428-416.000.
Tomioka, Akihiro: *See—*
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Tomita, Mamoru: *See—*
Okonogi, Shigeo; Tomita, Mamoru; Shimamura, Seiichi; Ishibashi, Norio; and Kudo, Tsutomu, 4,888,171, Cl. 424-93.000.
Tomita, Masami; Nomura, Yoshihiro; Ide, Noriaki; and Ohtaki, Kazumi, to Ricoh Co., Ltd. Color toner for electrophotography. 4,888,263, Cl. 430-106.000.
Tomlin, Jerry B.; and Olejak, Ingo W. V., to Koomey, Inc. Pilot actuated spool valve. 4,887,643, Cl. 137-625.660.
Toni, Darryl; and Poss, Eliasz, to United Technologies Corporation. Electrical continuity means for composite joints. 4,888,451, Cl. 174-94.00R.
Tonka Corporation: *See—*
Moormann, Randall H., 4,887,812, Cl. 273-1.50R.
Toop, Gerald W.: *See—*
Dunlop, John A.; Milner, Edward F. G.; Smyth, Robert W.; and Toop, Gerald W., 4,887,492, Cl. 75-77.000.
Topliss, Robert J.; Brockmeier, Norman F.; and Lindahl, Harold A., to Amoco Corporation. Advanced control strategies for melt flow rate and reactor concentration in the polypropylene slurry process. 4,888,704, Cl. 364-500.000.
Toray Industries, Inc.: *See—*
Oka, Tetsuo; Hayashi, Kenji; Akamatsu, Takayoshi; and Horiuchi, Satoshi, 4,888,211, Cl. 427-130.000.
Torimi, Akira: *See—*
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,887,522, Cl. 98-40.200.
Torremans, Joseph L. G.: *See—*
Janssens, Frans E.; Torremans, Joseph L. G.; and Hens, Jozef F., 4,888,426, Cl. 546-118.000.
Tosaka, Yoichi; and Shoji, Toru, to Canon Kabushiki Kaisha. Film code read out device. 4,888,604, Cl. 354-21.000.
Toshiba Ceramics Co., Ltd.: *See—*
Hayashi, Kenrou; Oguma, Reiji; and Tamura, Masayuki, 4,888,142, Cl. 264-65.000.
Toth, Douglas J., to Under Sea Industries, Inc. Integral buoyancy and ballast system for scuba divers. 4,887,932, Cl. 405-186.000.
Tottori, Takafumi, to Minolta Camera Kabushiki Kaisha. Multi-color image forming apparatus for forming a latent image pattern by use of residual toner remaining in a developing device. 4,888,619, Cl. 355-210.000.
Tougne, Daniel: *See—*
Feron, Paul; and Tougne, Daniel, 4,888,495, Cl. 307-39.000.
Touzani, William. Freshness and tamper monitoring closure. 4,887,730, Cl. 215-271.000.
Toyo Boseki Kabushiki Kaisha: *See—*
Maeda, Satoshi; Yoneda, Ryu; Yokota, Kenichi; and Miyake, Hideo, 4,888,208, Cl. 427-96.000.
Toyo Seikan Kaisha, Ltd.: *See—*
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Toyo Tanson Co., Ltd.: *See—*
Matsuo, Koichiro; Maekawa, Kazuhiro; and Kondo, Teruhisa, 4,888,242, Cl. 428-408.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Tabata, Masaaki, 4,887,515, Cl. 92-80.000.

Trahan, Albert J.: *See—*
Douglas, Robert J.; and Trahan, Albert J., 4,888,040, Cl. 65-307.000.

Trailmobile Inc.: *See—*
Fenton, Gary; and Huddle, Tom, 4,887,437, Cl. 62-186.000.

Tran, Kifu O.: *See—*
Gauneus, Gilbert; Nicaise, Maryvonne; and Tran, Kifu O., 4,888,019, Cl. 623-18.000.

Trans-World Marketing Corporation: *See—*
Franklin, Robert P., 4,887,783, Cl. 248-220.400.

Trask, Elwood G.: *See—*
Smith, Gerald J.; Trask, Elwood G.; Ellis, Paul; Johnston, Jon; Campbell, Brian; and Rorie, Leon, 4,888,234, Cl. 428-234.000.

Trausch, Gunter E.: *See—*
Heinzl, Joachim; Lehmann, Manfred; and Trausch, Gunter E., 4,888,598, Cl. 346-140.00R.

Traver, Frank J., to General Electric Company. Stable, two package water emulsions of silicone hydride fluids. 4,888,384, Cl. 524-862.000.

Tresh, Thomas M. Baseball slide practice device. 4,887,811, Cl. 272-56.50R.

Trevelyan, James P.; and Whitehead, Andrew M., to University of Western Australia, The. Animal head restraint. 4,887,553, Cl. 119-154.000.

Tri-State Oil Tool Industries, Inc.: *See—*
Lynde, Gerald D.; and Price, James M., 4,887,668, Cl. 166-55.800.

Tri, Terry O.: *See—*
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Trilla, Antonio S.: *See—*
Solano, Victorino S.; and Trilla, Antonio S., 4,887,705, Cl. 192-111.00A.

Tritton, Gary E.: *See—*
Tritton, Victor R.; Tritton, Gary E.; and Chevillard, Paul F., 4,887,855, Cl. 292-307.00R.

Tritton, Victor R.; Tritton, Gary E.; and Chevillard, Paul F., to Les Enterprises Tritton Ltee. Shackle type seal. 4,887,855, Cl. 292-307.00R.

Trondle, Robert: *See—*
Weisshuhn, Elmer; Bubik, Alfred; Dahl, Hans; Holik, Herbert; Kurtz, Rudiger; Zembrot, Anton; Stotz, Wolf-Gunter; Seider, Werner; and Trondle, Robert, 4,888,094, Cl. 162-198.000.

Troster, Manfred; and Hofmann, Heinrich, to FAG Kugelfischer Georg Schafer (KGaA). Wheel mount and method of connecting the parts of a wheel mount. 4,887,917, Cl. 384-543.000.

Trudeau, William H., to O & S Manufacturing Company. Torque rod of composite material. 4,888,236, Cl. 428-34.100.

TRW Inc.: *See—*
Drutchas, Gilbert H., deceased; and Borza, John S., 4,887,682, Cl. 180-79.100.
Klosterhaus, Edwin G.; and Feindel, Robert E., 4,887,683, Cl. 180-148.000.
Wood, Ruey E., Jr., 4,887,486, Cl. 74-588.000.

Tsai, Hun-Lian: *See—*
Chen, Ih-Chin; Shen, Bing W.; Bohlman, James G.; and Tsai, Hun-Lian, 4,888,820, Cl. 361-313.000.

Tsai, Peter. Outdoor game dart. 4,887,822, Cl. 273-420.000.

Tsang, Yuk L.: *See—*
Aboelfotoh, Mohamed O.; and Tsang, Yuk L., 4,888,297, Cl. 437-41.000.

Tseng, Shin S.; Dusza, John P.; and Epstein, Joseph W., to American Cyanamid Company. 4,8-disubstituted-1,2-dihydro and 1,2,3,4-tetrahydroimidazo-[1,5-a] pyrimidines. 4,888,345, Cl. 514-258.000.

Tsuboi, Tetsuo: *See—*
Tajima, Kenji; Tsuboi, Tetsuo; and Arata, Ryozo, 4,888,371, Cl. 524-120.000.

Tsubota, Hiroyki: *See—*
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Tsuji, Kazutaka: *See—*
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Tsujimoto, Shinichi; Amano, Kenichiro; and Itch, Kenji, to Canon Kabushiki Kaisha. Display apparatus. 4,888,610, Cl. 354-475.000.

Tsunaga, Masayuki; Yuba, Kazuaki; and Kaneko, Youichi, to Mitsui Mining & Smelting Co., Ltd. Electrically conductive powder and electrically conductive composition using the same. 4,888,135, Cl. 252-512.000.

Tsutsui, Mitsukuni: *See—*
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Tubauto: *See—*
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Tuckey, Robert W., Jr. Bulk sampler tool. 4,887,413, Cl. 53-520.000.

Tupper, Donna D. Window washer caddy. 4,887,713, Cl. 206-225.000.

Turner, Charles B.: *See—*
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Tutt, Lee W.; and Jensen, John E., to Hughes Aircraft Company. Photochemical deposition of high purity gold films. 4,888,204, Cl. 427-53.100.

Tzeng, Ming-Her. Folding glasses. 4,887,895, Cl. 351-63.000.

Uchida, Koji: *See—*
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Uchiyama, Kyoichi: *See—*
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,887,769, Cl. 239-493.000.

Uda, Tsuyoshi: *See—*
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Ueda, Masataka: *See—*
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Ueda, Minoru; Matsuda, Hideaki; and Mori, Hideki, to Okura Kogyo Kabushiki Kaisha. Process for producing plastic-like woody moldings from dibasic acid anhydrides and unsaturated monoglycidyl ethers. 4,888,403, Cl. 527-103.000.

Ueda, Seiichi: *See—*
Shimokawa, Ryushi; Ueda, Seiichi; Kamata, Yasuji; Yamashita, Kenkichi; Kato, Kazuo; and Sato, Hideo, 4,888,561, Cl. 330-290.000.

Ueda, Shiro: *See—*
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Ueda, Toshihiko, to Minolta Camera Kabushiki Kaisha. Zoom lens system for use in microfilm projection apparatus. 4,887,891, Cl. 350-427.000.

Ueda, Youichi: *See—*
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Uehara, Kensuke: *See—*
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Ueki, Kazuyoshi: *See—*
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Ueno, Sadayasu, to Hitachi, Ltd. Life diagnosis apparatus for automotive battery. 4,888,716, Cl. 364-550.000.

Ueno, Takeshi: *See—*
Kuno, Toshio; Shindo, Yoshikazu; Kuno, Yukio; Ueno, Takeshi; Torimi, Akira; and Mori, Yoji, 4,887,522, Cl. 98-40.200.

Uggeri, Fulvio: *See—*
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Uhl, Guenter: *See—*
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Uhrig, L. Oscar: *See—*
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Uken, William D.: *See—*
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Ultrasonic Arrays, Inc.: *See—*
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Umeda, Tetsuo; and Sugiura, Fumihiko, to NEC Corporation. Optimal image-quality selection apparatus. 4,888,646, Cl. 358-464.000.

Umehara, Teruo; Daicho, Hiroyuki; and Taketomi, Seiki, to Hitachi Metals, Ltd. Voice coil-type linear motor. 4,888,506, Cl. 310-13.000.

Umesato, Shoji: *See—*
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Under Sea Industries, Inc.: *See—*
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Underwood, Roy F.: *See—*
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Uniden America Corporation: *See—*
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Unilever Patent Holdings BV: *See—*
Araya, Abraham, 4,888,309, Cl. 501-80.000.
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Union Carbide Chemicals and Plastics Company Inc.: *See—*
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Union Carbide Corporation: *See—*
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Union Oil Co. of California: *See—*
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Miller, Alex E., 4,888,185, Cl. 426-72.000.
Uniroyal Chemical Company, Inc.: *See—*
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Unisys Corporation: *See—*
Hayden, L. M., 4,887,884, Cl. 350-96.290.
Unitaka Ltd.: *See—*
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U.S. Golf Association: *See—*
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Administrator, National Aeronautics and Space Administration: *See—*
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Agriculture: *See—*
Beremand, Phillips D.; Ohlrogge, John B.; and Kuhn, David N., 4,888,282, Cl. 435-193.000.
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Berry, Mark D.; Brisker, Henry C.; and Cuneo, Andrew A., Jr., 4,888,546, Cl. 324-64.000.
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Buttram, Malcolm T.; and Ginn, Jerry W., 4,888,556, Cl. 328-233.000.
Kessie, Robert W., 4,888,102, Cl. 204-231.000.
Martin, John C.; and Buican, Tudor N., 4,887,721, Cl. 209-579.000.
Weingart, Richard C., 4,888,522, Cl. 315-111.610.
Zaromb, Solomon; and Stetter, Joseph R., 4,888,295, Cl. 436-161.000.
National Aeronautics and Space Administration: *See—*
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Goodrich, Winston D.; Wesselski, Clarence J.; Pelischek, Timothy E.; Becker, Bruce H.; Kahn, Jon B.; Grimaldi, Margaret E.; McManamen, John P.; and Castro, Edgar O., 4,887,780, Cl. 244-137.200.
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Borgis, Livio, 4,888,519, Cl. 313-318.000.
Clasen, Rolf, 4,888,036, Cl. 65-18.100.
Driessen, Leonardus M. H. E.; Janse, Cornelis P.; and Lahaije, Paul D. M. E., 4,888,698, Cl. 364-443.000.
Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H.; and Linde, Rolf E., 4,888,794, Cl. 378-41.000.
Knibbeler, Charles L. C. M., 4,888,809, Cl. 381-103.000.
Van Der Maaden, Johan, 4,887,354, Cl. 29-868.000.
Veenvliet, Hendrik; Raaymakers, Antonius H. M.; Verkerk, Maarten J.; and Witjes, Arnold H., 4,888,201, Cl. 427-38.000.
United Technologies Automotive, Inc.: *See—*
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United Technologies Corporation: *See—*
Auxier, Thomas A.; Rannie, James B.; and Field, Robert E., 4,887,663, Cl. 165-47.000.
Davis, Jack W.; and Brown, Clyde O., 4,888,786, Cl. 372-58.000.
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Duhl, David N.; and Chin, Stephen, 4,888,069, Cl. 148-404.000.
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Porterfield, Richard F.; and Biesecker, Douglas A., 4,887,351, Cl. 29-740.000.
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Pak, Charles Y. C., 4,888,182, Cl. 424-677.000.
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Mittal, Ravinder K., 4,887,610, Cl. 128-733.000.
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VanCucha, James M., to Cleveland Container Corporation. Sealed container. 4,887,736, Cl. 220-355.000.
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Van Unen, Lambert H. T.: *See*—
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Readshaw, Lenard T.; VanVelzen, Cornelis N.; Paquette, John L.; and McKeown, Kenneth O., 4,887,494, Cl. 76-27.000.

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Varian Associates, Inc.: *See*—
Codrington, Robert S., 4,888,553, Cl. 324-312.000.

Varo, Inc.: *See*—
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Appel, Hans-Gunter; Ohm, Heinz-Friedrich; Bluhm, Klaus; and Probst, Kurt, 4,888,537, Cl. 318-626.000.
Meicher, Joachim, 4,897,570, Cl. 123-339.000.
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Handler, Michael D., 4,887,338, Cl. 24-306.000.

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Vesterlund, Gunnar, to ABB Atom AB. Control rod for nuclear reactors. 4,888,150, Cl. 376-333.000.

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Victor Company of Japan, Ltd.: *See*—
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Videocolor: *See*—
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Vilmin, Gabriel G. J.: *See*—
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Viscom Systems, Inc.: *See*—
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Vlach, Frank: *See*—
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Vogeler, Helmut: *See*—
Krehl, Gerhard; and Vogeler, Helmut, 4,888,452, Cl. 174-101.000.

Voges, Kenneth, to Red Bud Industries, Inc. Machine for slitting metal sheet. 4,887,502, Cl. 83-479.000.

Vollath, Guenter. Speed sensitive safety lock for arresting a runaway control lever. 4,887,483, Cl. 74-526.000.

von Rybinski, Wolfgang: *See*—
Mueller, Heinz; Herold, Claus-Peter; van Tapavizca, Stephan; Dolhaine, Hans; von Rybinski, Wolfgang; and Wichelhaus, Winfried, 4,888,120, Cl. 252-8.551.

Votolato, Alfred F.: *See*—
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Vyas, Dolatrai M.: *See*—
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W. L. Gore & Associates, Inc.: *See*—
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Milliken, Robert D., 4,888,200, Cl. 427-31.000.
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Rosenberg, Arnold M.; Gaidis, James M.; and Kindt, Lawrence J., 4,888,058, Cl. 106-98.000.

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Rothen, Johann, 4,887,636, Cl. 137-487.500.

Wacker-Chemie GmbH: *See*—
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Wacker, Robert L.; Shuster, Donald E.; Sharpless, John; Knobbe, Alan J.; and Murphy, James C., to Nordson Corporation. Electrostatic rotary atomizing liquid spray coating apparatus. 4,887,770, Cl. 239-703.000.

Wada, Akihiro; Kakuta, Rin-ichi; Ohuchi, Kenji; Sugiyama, Jun; and Hasegawa, Shinji, to Asahi Kasei Kogyo Kabushiki Kaisha. Resin composition comprising a polyamide or polycarbonate. 4,888,387, Cl. 525-66.000.

Wada, Fusazo: *See*—
Sugimoto, Noritsugu; Mori, Nobuyuki; Nakamura, Shozi; and Wada, Fusazo, 4,888,223, Cl. 428-34.900.

Wada, Kanji, to Minolta Camera Kabushiki Kaisha. Image recording apparatus with improved SOS detection. 4,888,647, Cl. 358-474.000.

Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, to Polyplastics Co., Ltd. Liquid crystal polycester resin composition having excellent surface characteristics. 4,888,127, Cl. 252-299.500.

Wada, Shunichi: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; Wada, Shunichi; and Ohtagaki, Shigeki, 4,887,840, Cl. 280-707.000.

Wagner, Daniel B., to Becton Dickinson and Company. Vesicles resistant to enzyme lysis and use thereof in an enzyme assay. 4,888,288, Cl. 435-21.000.

Wagner, Dieter: *See*—
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Wain, David: *See*—
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Wakasugi, Tomio; and Tanaka, Hideshi, to Hewlett Packard Company. Apparatus for measuring vector voltage ratio. 4,888,701, Cl. 364-482.000.

Wakeman, Russell J., to Siemens-Bendix Automotive Electronics L.P. Modular, self-contained hydraulic valve timing systems for internal combustion engines. 4,887,562, Cl. 123-90.120.

Wakita, Saburo: *See*—
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Waldenrath, Werner: *See*—
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Walker, John A. Casino board game. 4,887,819, Cl. 273-256.000.

Walker, Michael L.: *See*—
Dill, Walter R.; and Walker, Michael L., 4,888,121, Cl. 252-8.553.

Waltel, Joseph, Jr. Irrigation system for commercial plant cultivation. 4,887,388, Cl. 47-79.000.

Walters, Lonnie D. Heat recovery apparatus. 4,887,586, Cl. 126-101.000.

Walther, Karl G.; and Walther, Ronald G., to Magfoil & Inspektionstechniken GmbH. Apparatus for marking individual points of an underwater construction. 4,888,745, Cl. 367-129.000.

Walther, Ronald G.: *See*—
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Walton, Charles A. Proximity identification system with lateral flux magnetic rod coupling. 4,888,474, Cl. 235-449.000.

Walz, Gerd, to Hoechst AG. Use of an agent for production of a constant coating thickness during cathodic electrocoating. 4,888,055, Cl. 106-1.050.

Wang, Ching-Rong. Automobile steering lock. 4,887,443, Cl. 70-209.000.

Wang Laboratories, Inc.: *See*—
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Wang, Moon-Yee: *See*—
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Wang, Pen C., to Shell Oil Company. Polymeric polyhydroxy polyether containing 1,6-diazaspiro-[4.4]nonane-2,7-dione units. 4,888,408, Cl. 528-96.000.
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Watabe, Mitsuru: *See*—
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Watanabe, Keiichiro; and Ohashi, Tsuneaki, to NGK Insulators, Ltd. Zirconyl phosphate sintered bodies and production thereof. 4,888,312, Cl. 501-102.000.
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Watanabe, Yoshitaka; Mizoguchi, Yoshiyuki; and Hiraga, Hiroyuki, to Canon Kabushiki Kaisha. Recording apparatus with bipositional sheet guiding member. 4,888,602, Cl. 346-134.000.
Watkins, Gerald J.: *See*—
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Watson, Graham; and Furumoto, Horace, to General Hospital Corporation, The. Use of lasers to break down objects. 4,887,600, Cl. 606-128.000.
Watson, Keith G.; and Lovel, Craig G., to ICI Australia Limited. Herbicidal amino-mesityl cyclohexane-1,3-dione compounds. 4,888,043, Cl. 71-88.000.
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Weibelzahl, Manfred; and Wild, Georg, to Siemens Aktiengesellschaft. Method and apparatus for decoupling the active and reactive power control for a high voltage DC transmission line coupling two networks. 4,888,674, Cl. 363-35.000.
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Weinberger, Gerald J.; Lee, Roger C.; and Miller, Stanley F., to Rates Technology Inc. Apparatus and method for determining cost of telephone calls. 4,888,822, Cl. 379-130.000.
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Weingart, Richard C., to United States of America, Energy. Electrical method and apparatus for impelling the extruded ejection of high-velocity material jets. 4,888,522, Cl. 315-111.610.
Weinreb, Robert L. Shoulder pad. 4,887,318, Cl. 2-268.000.
Weinstein, Richard, to DeVilbiss Company, The. Air bearing rotary atomizer. 4,887,768, Cl. 239-222.000.
Weisshuhn, Elmer; Bubik, Alfred; Dahl, Hans; Holik, Herbert; Kurtz, Rudiger; Zembrot, Anton; Stotz, Wolf-Gunter; Seider, Werner; and Trondle, Robert, to Sulzer-Escher WYSS GmbH. Method of operating a headbox apparatus for a papermaking machine. 4,888,094, Cl. 162-198.000.
Weissman, Sherman: *See*—
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Shiraga, Yusei; Fukaya, Chikara; Akira, Toshiaki; Iwai, Masakazu; Yokoyama, Kazumasa; Tabata, Mamoru; Fukui, Hiroshi; Tanaka, Shigeo; Iga, Yoshiro; Suyama, Tadakazu; and Okano, Kanemichi, 4,888,417, Cl. 536-4.100.

Yokoyama, Takayuki: *See*—
Ando, Fumio; Ichinokawa, Kazuo; and Yokoyama, Takayuki, 4,888,795, Cl. 379-53.000.

Yokoyama, Yukio, to Tanaka Kogyo Co., Ltd. Small engine provided with self starting motor. 4,887,476, Cl. 74-7.00E.

Yoneda, Ryu: *See*—
Maeda, Satoshi; Yoneda, Ryu; Yokota, Kenichi; and Miyake, Hideo, 4,888,208, Cl. 427-96.000.

Yoshida, Hiroshi: *See*—
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,888,731, Cl. 365-49.000.

Yoshida, Takeo: *See*—
Takahashi, Masaharu; and Yoshida, Takeo, 4,888,374, Cl. 524-227.000.

Yoshimaru, Tomohisa; and Kajitani, Seinosuke, to Kabushiki Kaisha Toshiba. Image information processing apparatus. 4,888,751, Cl. 369-36.000.

Yoshimitsu, Kazumi, deceased (by Yoshimitsu, Mihoko, administratrix); Sekido, Shintaro; Kazehara, Kenya; Kajita, Kozo; and Manabe, Toshikatsu, to Hitachi Maxell, Ltd. Non-aqueous electrochemical cell. 4,888,255, Cl. 429-101.000.

Yoshimitsu, Mihoko, administratrix: *See*—
Yoshimitsu, Kazumi, deceased; Sekido, Shintaro; Kazehara, Kenya; Kajita, Kozo; and Manabe, Toshikatsu, 4,888,255, Cl. 429-101.000.

Yoshimoto, Yoshiaki, to Nissan Motor Co., Ltd. Automotive suspension system suppressive of toe-out change in response to longitudinal shifting of load. 4,887,839, Cl. 280-690.000.

Yoshino, Thunekazu; Morita, Hiroshi; Nakano, Hirotaka; Hayashi, Nobuo; and Kubota, Yuko, to Kabushiki Kaisha Toshiba. Bonding sheet for electronic component and method of bonding electronic component using the same. 4,887,760, Cl. 228-56.300.

Yoshitomi, Yasunari; Iwayama, Kenzo; Nagashima, Takeo; and Yakashiro, Kenichi, to Nippon Steel Corporation. Method for producing grain-oriented electrical steel sheet with very high magnetic flux density. 4,888,066, Cl. 148-113.000.

Yoshizumi, Toshiaki: *See*—
Sugiyama, Tsutomu; and Yoshizumi, Toshiaki, 4,887,511, Cl. 91-361.900.

Young, Ian A., to Intel Corporation. Constant current biased common gate differential sense amplifier. 4,888,503, Cl. 307-530.000.

Young, Lionel A.: *See*—
Lebeck, Alan O.; and Young, Lionel A., 4,887,395, Cl. 51-101.00R.

Young, Robert D.: *See*—
Harris, Frank R.; and Young, Robert D., 4,887,789, Cl. 249-16.000.

Yu, Francis T.: *See*—
Bong, Ban S.; Yu, Francis T.; and Bremer, Robert, 4,888,566, Cl. 331-116.00R.

Yuasa, Hirofumi: *See*—
Kubo, Masami; Ochiai, Takashi; and Yuasa, Hirofumi, 4,888,339, Cl. 514-392.000.

Yuba, Kazuaki: *See*—
Tsunaga, Masayuki; Yuba, Kazuaki; and Kaneko, Youichi, 4,888,135, Cl. 252-512.000.

Yutaka Electric Mfg. Co., Ltd.: *See*—
Hiramatsu, Rihei; Imano, Seiji; Watanabe, Kazushi; and Takeishi, Shinzo, 4,888,672, Cl. 363-49.000.

Zabsky, John M.: *See*—
Scruggs, David M.; and Zabsky, John M., 4,888,758, Cl. 369-101.000.

Zaccone, Joseph J.: *See*—
Long, Richard J.; and Zaccone, Joseph J., 4,887,320, Cl. 2-424.000.

Zacher, A. Richard: *See*—
Lilja, David J.; Zacher, A. Richard; and Wierenga, Steven W., 4,888,684, Cl. 364-200.000.

Zackrisson, Barry L.; and Beckman, John A., to Dana Corporation. Composite tubular elements and methods of fabrication. 4,888,224, Cl. 428-35.900.

Zambon, S.p.A.: *See*—
Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, 4,888,433, Cl. 549-450.000.

Zandstra, Lawrence: *See*—
Dekker, Donald A.; and Zandstra, Lawrence, 4,887,808, Cl. 271-181.000.

Zangenfeind, Helmut; and Wurfel, Reinhart, to AGFA-Gevaert Aktiengesellschaft. Method of and apparatus for processing exposed photographic films. 4,888,613, Cl. 355-41.000.

Zanker, Klaus: *See*—
Tannenbaum, Eli; Burgess, Trevor; Koiessidis, Vassilios; Orban, Andre; Williams, John; and Zanker, Klaus, 4,887,464, Cl. 73-153.000.

Zaromb, Solomon; and Stetter, Joseph R., to United States of America, Energy. Portable system and method combining chromatography and array of electrochemical sensors. 4,888,295, Cl. 436-161.000.

Zatlin, Jeffrey. Skatecraft. 4,887,824, Cl. 280-87.042.

Zayat, Charles. Clamping tool. 4,887,498, Cl. 81-185.000.

Zecchino, Julius R.: *See*—
Dulak, Michael P.; and Zecchino, Julius R., 4,888,363, Cl. 514-725.000.

Zeeh, Bernd: *See*—
Rueb, Lothar; Eicken, Karl; Zeeh, Bernd; Meyer, Norbert; and Wuerzer, Bruno, 4,888,046, Cl. 71-90.000.

Zeidler, Ulrich; and Meffert, Alfred, to Henkel Kommanditgesellschaft auf Aktien. Alkyl hydroxyalkyl phosphoric acid esters. 4,888,437, Cl. 558-105.000.

Zeiger, Allen R., to Thomas Jefferson University. Novel immunosorbent assays employing antibiotic keying agents. 4,888,279, Cl. 435-7.000.

Zembrot, Anton: *See*—
Weisshuhn, Elmer; Bubik, Alfred; Dahl, Hans; Holik, Herbert; Kurtz, Rudiger; Zembrot, Anton; Stotz, Wolf-Gunter; Seider, Werner; and Trondle, Robert, 4,888,094, Cl. 162-198.000.

Zirilli, Michele D.: *See*—
Herbert, Glenn M.; Kneisel, Charles S.; McDonald, Russell; Povio, Raymond A.; and Zirilli, Michele D., 4,887,805, Cl. 271-94.000.

Zmyslowski, Allan J.: *See*—
Taylor, Michael D.; Maier, Robert M.; Begley, Michael J.; Zmyslowski, Allan J.; Thomas, Jeffrey A.; and Petolino, Joseph A., 4,888,689, Cl. 364-200.000.

Zuber, Larry L.: *See*—
Hoff, Steven R.; and Zuber, Larry L., 4,887,451, Cl. 72-402.000.

Zucker, Friedhelm, to Deutsche Thomson-Brandt GmbH. Optical scanning system for focussing a compact-disk player. 4,888,476, Cl. 250-201.000.

Zuckerbrod, David, to Westinghouse Electric Corp. Separator. 4,888,256, Cl. 429-144.000.

Zuponcic, Ralph P.: *See*—
Fetcenko, Raymond M.; Wydro, Jan; and Zuponcic, Ralph P., 4,888,082, Cl. 156-500.000.

Zurcher, Urs, to BBC Brown Boveri AG. Damping circuit for turn-off valves. 4,888,676, Cl. 363-58.000.

Zweben, Carl H.; Mogle, Rodman A.; Rodini, Benjamin T., Jr.; and Thaw, Charles L., to General Electric Company. Low-thermal-expansion, heat conducting laminates having layers of metal and reinforced polymer matrix composite. 4,888,247, Cl. 428-105.000.

501 Blistex Inc.: *See*—
Green, Richard K., 4,887,924, Cl. 401-261.000.

501 Ohmega Electronics, Inc.: *See*—
Rice, James M.; and Mahler, Bruce P., 4,888,574, Cl. 338-309.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 19TH DAY OF DECEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aoki, Katsumichi; Kanda, Yoichi; Satake, Keigo; and Shinkawa, Hiroyasu, to Kureha Kagaku Kogyo Kabushiki Kaisha. 1,5-diphenyl derivative of 1H-1,2,4-triazole-3-carboxamide and herbicide containing the same. Re. 33,132, Cl. 71-92.000.

de Cortanze, Andre, to Elf France. Supporting arm assembly for a driving wheel of an automotive vehicle. Re. 33,130, Cl. 180-227.000.

Elf France: *See*—
de Cortanze, Andre, Re. 33,130, Cl. 180-227.000.

Hagen Batterie AG: *See*—
Kiessling, Reiner, Re. 33,133, Cl. 429-242.000.

Kanda, Yoichi: *See*—
Aoki, Katsumichi; Kanda, Yoichi; Satake, Keigo; and Shinkawa, Hiroyasu, Re. 33,132, Cl. 71-92.000.

Kiessling, Reiner, to Hagen Batterie AG. Negative electrode for lead accumulators. Re. 33,133, Cl. 429-242.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Aoki, Katsumichi; Kanda, Yoichi; Satake, Keigo; and Shinkawa, Hiroyasu, Re. 33,132, Cl. 71-92.000.

Morrison, Donald R. Motorized dumping vehicle. Re. 33,131, Cl. 298-1.00H.

Satake, Keigo: *See*—
Aoki, Katsumichi; Kanda, Yoichi; Satake, Keigo; and Shinkawa, Hiroyasu, Re. 33,132, Cl. 71-92.000.

Shinkawa, Hiroyasu: *See*—
Aoki, Katsumichi; Kanda, Yoichi; Satake, Keigo; and Shinkawa, Hiroyasu, Re. 33,132, Cl. 71-92.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Baraff, David R.: *See*—
Kos, Steven; and Baraff, David R., B1 4,149,197, Cl. 358-471.000.

Bell-Northern Research Ltd.: *See*—
Kos, Steven; and Baraff, David R., B1 4,149,197, Cl. 358-471.000.

Blair, John J.; and Shue, Roger C., to Dentsply Research & Development Corp. Dental restoration shading. B1 4,650,418, 12-19-89, Cl. 433-203.100.

Caddock, Richard E. Non-inductive film-type cylindrical resistor. B1 3,858,147, 12-19-89, Cl. 338-62.000.

Cleare, Michael J.; Heescheler, James D.; Rosenberg, Barnett; and Van Camp, Loretta L., to Research Corporation Technologies, Inc. Malonato platinum anti-tumor compounds. B1 4,140,707, 12-19-89, Cl. 556-137.000.

Dentsply Research & Development Corp.: *See*—
Blair, John J.; and Shue, Roger C., B1 4,650,418, Cl. 433-203.100.

Elpatronic AG: *See*—
Opprecht, Paul, B1 3,842,235, Cl. 219-83.000.

Farnhill, William M.: *See*—
Parker, Alan; and Farnhill, William M., B1 4,522,022, Cl. 57-401.000.

Heescheler, James D.: *See*—
Cleare, Michael J.; Heescheler, James D.; Rosenberg, Barnett; and Van Camp, Loretta L., B1 4,140,707, Cl. 556-137.000.

Hollingsworth (U.K.) Limited: *See*—
Parker, Alan; and Farnhill, William M., B1 4,522,022, Cl. 57-401.000.

Hull, Charles W., to UVP, Inc. Apparatus for production of three-dimensional objects by stereolithography. B1 4,575,330, 12-19-89, Cl. 425-174.400.

Kos, Steven; and Baraff, David R., to Bell-Northern Research Ltd. Direct imaging apparatus for an electronic document transmitter utilizing a linear array of photo-detectors. B1 4,149,197, 12-19-89, Cl. 358-471.000.

Opprecht, Paul, to Elpatronic AG. Method of electric seam resistance welding. B1 3,842,235, 12-19-89, Cl. 219-83.000.

Ouellette, Joseph F., to Ouellette Machinery Systems Inc. Top feeding and ejecting materials handling apparatus. B1 4,557,656, 12-19-89, Cl. 414-790.800.

Ouellette Machinery Systems Inc.: *See*—
Ouellette, Joseph F., B1 4,557,656, Cl. 414-790.800.

Parker, Alan; and Farnhill, William M., to Hollingsworth (U.K.) Limited. Rollers for friction spinning apparatus. B1 4,522,022, 12-19-89, Cl. 57-401.000.

Research Corporation Technologies, Inc.: *See*—
Cleare, Michael J.; Heescheler, James D.; Rosenberg, Barnett; and Van Camp, Loretta L., B1 4,140,707, Cl. 556-137.000.

Rosenberg, Barnett: *See*—
Cleare, Michael J.; Heescheler, James D.; Rosenberg, Barnett; and Van Camp, Loretta L., B1 4,140,707, Cl. 556-137.000.

Shue, Roger C.: *See*—
Blair, John J.; and Shue, Roger C., B1 4,650,418, Cl. 433-203.100.

UVP, Inc.: *See*—
Hull, Charles W., B1 4,575,330, Cl. 425-174.400.

Van Camp, Loretta L.: *See*—
Cleare, Michael J.; Heescheler, James D.; Rosenberg, Barnett; and Van Camp, Loretta L., B1 4,140,707, Cl. 556-137.000.

LIST OF DESIGN PATENTEES

Abbott Laboratories: *See*—
Pastrone, John, 305,150, Cl. D24-8.000.

Abe, Yoshinori: *See*—
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 305,115, Cl. D13-4.000.
Yamaura, Yutaka; Nakamura, Takashi; Yamauchi, Satomi; and Abe, Yoshinori, 305,126, Cl. D15-72.000.

Albeck, Shirley: *See*—
Thompson, Marion E., 305,089, Cl. D7-379.000.

Aoki, Tsunetaka, to Yoshida Kogyo K. K. Slider for slide fastener. 305,106, 12-19-89, Cl. D11-221.000.

Artemide S.p.A.: *See*—
De Lucchi, Michele, 305,155, Cl. D26-65.000.

Artin Industrial Co., Ltd.: *See*—
Ng, Tat K., 305,135, Cl. D21-143.000.

Auto-Shade, Inc.: *See*—
Ruimi, Avi, 305,132, Cl. D19-65.000.

Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., to Dart Industries Inc. Toy polar bear or the like. 305,140, 12-19-89, Cl. D21-159.000.

Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., to Dart Industries Inc. Toy lion or the like. 305,141, 12-19-89, Cl. D21-163.000.

Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., to Dart Industries Inc. Toy giraffe or the like. 305,142, 12-19-89, Cl. D21-164.000.

Beauparlant, Leslie: *See—*
Moore, Ann A., 305,078, Cl. D3-32.000.

Bendickson, Roy B.: *See—*
Collins, Walter W.; Bendickson, Roy B.; and Seaton, Robert A., 305,090, Cl. D8-4.000.

Biku Industries, Inc.: *See—*
Rubio, Hugo; Riaz, Mohammad; and Patel, Bhikhabhai A., 305,134, Cl. D21-81.000.

Bisha', Jon, to Fisher Scientific Group Inc. Combined IV tube slide clamp and associated peristaltic pumping chamber. 305,151, 12-19-89, Cl. D24-29.000.

Blasiman, Gerald A. Stuffed maple leaf toy figure. 305,136, 12-19-89, Cl. D21-155.000.

Blasiman, Gerald A. Stuffed sweet gum leaf toy figure. 305,137, 12-19-89, Cl. D21-155.000.

Blasiman, Gerald A. Stuffed oak leaf toy figure. 305,138, 12-19-89, Cl. D21-155.000.

Blasiman, Gerald A. Stuffed tulip leaf toy figure. 305,139, 12-19-89, Cl. D21-155.000.

Blumenthal, Martin, to Century Products Company. Walker. 305,108, 12-19-89, Cl. D12-130.000.

Braun Aktiengesellschaft: *See—*
Ullmann, Roland, 305,159, Cl. D28-49.000.

Bremmer, Gordon: *See—*
Tench, Wallace; Collins, Christopher; Petroff, Cvetan; and Bremmer, Gordon, 305,096, Cl. D8-99.000.

Brumbaugh, Richard P., Jr.: *See—*
Garrett, Terry L.; and Brumbaugh, Richard P., Jr., 305,123, Cl. D15-5.000.

Camens, Murray I. C., to U.S. Philips Corporation. Dry shaver. 305,160, 12-19-89, Cl. D28-51.000.

Camens, Murray I. C., to U.S. Philips Corporation. Dry shaver. 305,161, 12-19-89, Cl. D28-51.000.

Case, Robert; Morrow, James D.; and Podd, George O., III, to Emerson Electric Co. Combination wet and dry vacuum cleaner. 305,167, 12-19-89, Cl. D32-18.000.

Century Products Company: *See—*
Blumenthal, Martin, 305,108, Cl. D12-130.000.

Chester, Jon: *See—*
Olesen, Paul; and Chester, Jon, 305,092, Cl. D8-49.000.

Chikuzenya, Takao: *See—*
Ohtani, Rikio; Tsuji, Yasuyuki; Nakamura, Kimio; Kubo, Kazuyuki; Chikuzenya, Takao; and Nishino, Osamu, 305,130, Cl. D18-13.000.

Chonan, Katsuhiko: *See—*
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 305,115, Cl. D13-4.000.

Christensen, Winston E., to Winston Stove, Inc. Wood pellet burning stove. 305,148, 12-19-89, Cl. D23-343.000.

Cohn, Robert J.: *See—*
Kolvites, Albert; Giungo, John L.; and Cohn, Robert J., 305,172, Cl. D34-19.000.

Coinmaster (Proprietary) Limited: *See—*
Kennedy, Stephen E., 305,103, Cl. D10-91.000.

Collins, Christopher: *See—*
Tench, Wallace; Collins, Christopher; Petroff, Cvetan; and Bremmer, Gordon, 305,096, Cl. D8-99.000.

Collins, Walter W.; Bendickson, Roy B.; and Seaton, Robert A., to Fiskars Oy Ab. Pruner handle assembly. 305,090, 12-19-89, Cl. D8-4.000.

Converse, Rhea P. Cinch for holding a pneumatic pump head onto a tire valve. 305,097, 12-19-89, Cl. D8-394.000.

Crowle, William G.; and Udelhofen, Mark J., to Illinois Tool Works Inc. Back pack frame clip. 305,098, 12-19-89, Cl. D8-395.000.

Crowley, Kevin, to Wilson Sporting Goods Co. Sport shoe upper. 305,076, 12-19-89, Cl. D2-314.000.

Cushionite, Inc.: *See—*
Marini, Samuel J., 305,171, Cl. D34-6.000.

Dart Industries Inc.: *See—*
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,140, Cl. D21-159.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,141, Cl. D21-163.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,142, Cl. D21-164.000.

De Brey, Robert J. Lapel button. 305,105, 12-19-89, Cl. D11-99.000.

De Lucchi, Michele, to Artemide S.p.A. Adjustable floor lamp. 305,155, 12-19-89, Cl. D26-65.000.

Denton, Sharon J.: *See—*
Morgan, Virgil G.; Denton, Sharon J.; and Morgan, Wallace, 305,080, Cl. D4-122.000.

Drag Specialties, Inc.: *See—*
Stahel, Alwin J., 305,149, Cl. D23-364.000.

Elderkin, Lincoln. Combined d[illegible] and storage chest or similar article. 305,153, 12-19-89, Cl. D25-40.000.

Emerson Electric Co.: *See—*
Case, Robert; Morrow, James D.; and Podd, George O., III, 305,167, Cl. D32-18.000.

Essex, John D.; and Kieft, Milton G., to Hoover Company, The. Suction cleaner hood. 305,169, 12-19-89, Cl. D32-31.000.

Farberware Inc.: *See—*
Stewart, James B., 305,086, Cl. D7-21.000.

Fisher Scientific Group Inc.: *See—*
Bisha', Jon, 305,151, Cl. D24-29.000.

Fiskars Oy Ab: *See—*
Collins, Walter W.; Bendickson, Roy B.; and Seaton, Robert A., 305,090, Cl. D8-4.000.

Fukagawa, Kazumi, to Toyota Jidosha Kabushiki Kaisha. Radiator grille for an automobile. 305,112, 12-19-89, Cl. D12-163.000.

Gariano, Massimo, to Progress Consultant S.r.l. Combination handset telephone and stand therefor. 305,120, 12-19-89, Cl. D14-148.000.

Garrett, Terry L.; and Brumbaugh, Richard P., Jr. Quick release valve cover assembly. 305,123, 12-19-89, Cl. D15-5.000.

Geomation, Inc.: *See—*
Klebba, John M., 305,091, Cl. D8-14.000.

Giungo, John L.: *See—*
Kolvites, Albert; Giungo, John L.; and Cohn, Robert J., 305,172, Cl. D34-19.000.

Grosfillex, Raymond. Combined adjustable chair and ottoman unit. 305,081, 12-19-89, Cl. D6-361.000.

Gutknecht, Leroy H. Slot machine door. 305,133, 12-19-89, Cl. D21-38.000.

Gyebnar, Sally L. Cover for a comforter. 305,084, 12-19-89, Cl. D6-601.000.

Hall, David C., to Laughton & Sons Limited. Compact. 305,164, 12-19-89, Cl. D28-83.000.

Hans Rudolph, Inc.: *See—*
Rudolph, Hans; and Rudolph, Kevin, 305,165, Cl. D29-7.000.

Heary Bros. Lightening Protection Co., Inc.: *See—*
Heary, Kenneth P., 305,104, Cl. D10-105.000.

Heary, Kenneth P., to Heary Bros. Lightening Protection Co., Inc. Lightning arrester. 305,104, 12-19-89, Cl. D10-105.000.

Hinklin, Darrell W., to Toro Company, The. Snowthrower. 305,125, 12-19-89, Cl. D15-11.000.

Hitachi Koki Co., Ltd.: *See—*
Ohtani, Rikio; Tsuji, Yasuyuki; Nakamura, Kimio; Kubo, Kazuyuki; Chikuzenya, Takao; and Nishino, Osamu, 305,130, Cl. D18-13.000.

Hoover Company, The: *See—*
Essex, John D.; and Kieft, Milton G., 305,169, Cl. D32-31.000.

Hoshino, Kiyoshi; and Saito, Toshiaki, to Ryobi Ltd. Portable electric driver. 305,093, 12-19-89, Cl. D8-61.000.

Hosiden Electronics Co., Ltd.: *See—*
Masuda, Toru; and Ichitsubo, Norio, 305,117, Cl. D14-114.000.

Ichihara, Masuo; Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Kido, Katsutoshi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 305,087, 12-19-89, Cl. D7-351.000.

Ichihara, Masuo: *See—*
Kido, Katsutoshi; Kubo, Masayoshi; Matoba, Hisayoshi; Ichihara, Masuo; and Mizuma, Kensuke, 305,088, Cl. D7-351.000.

Ichikawa, Tadashi. Underwear for men. 305,075, 12-19-89, Cl. D2-11.000.

Ichitsubo, Norio: *See—*
Masuda, Toru; and Ichitsubo, Norio, 305,117, Cl. D14-114.000.

Iinuma, Hideo: *See—*
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 305,115, Cl. D13-4.000.

Illinois Tool Works Inc.: *See—*
Crowle, William G.; and Udelhofen, Mark J., 305,098, Cl. D8-395.000.

InterMetro Industries Corporation: *See—*
Kolvites, Albert; Giungo, John L.; and Cohn, Robert J., 305,172, Cl. D34-19.000.

Ito, Eiji: *See—*
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 305,115, Cl. D13-4.000.

Jaros, Philip; and Wright, Paul O., to White Mop Wringer Company. Mop wringer. 305,170, 12-19-89, Cl. D32-54.000.

Kabushiki Kaisha Sato: *See—*
Sato, Yo; and Kashiwaba, Tadao, 305,131, Cl. D18-19.000.

Kabushiki Kaisha Yoshikawa Kuni Kogyosho: *See—*
Yoshikawa, Toshimichi, 305,174, Cl. D34-40.000.

Kashiwaba, Tadao: *See—*
Sato, Yo; and Kashiwaba, Tadao, 305,131, Cl. D18-19.000.

Kellerman, Charles L.: *See—*
Muller, Peter J.; Kellerman, Charles L.; and Sirhall, James E., 305,154, Cl. D25-58.000.

Kendall, Sherman L.: *See—*
Kim, Wendy W.; Reynolds, Valdon G.; and Kendall, Sherman L., 305,157, Cl. D28-15.000.

Kennedy, Stephen E., to Coinmaster (Proprietary) Limited. Scale. 305,103, 12-19-89, Cl. D10-91.000.

Kido, Katsutoshi; Kubo, Masayoshi; Matoba, Hisayoshi; Ichihara, Masuo; and Mizuma, Kensuke, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 305,088, 12-19-89, Cl. D7-351.000.

Kido, Katsutoshi: *See—*
Ichihara, Masuo; Mizuma, Kensuke; Kubo, Masayoshi; Matoba, Hisayoshi; and Kido, Katsutoshi, 305,087, Cl. D7-351.000.

Kieft, Milton G.: *See—*
Essex, John D.; and Kieft, Milton G., 305,169, Cl. D32-31.000.

Kim, Wendy W.; Reynolds, Valdon G.; and Kendall, Sherman L., to Sorenson Development, Inc. Combined hair dryer and sprayer. 305,157, 12-19-89, Cl. D28-15.000.

Klebba, John M., to Geomation, Inc. Handle for manipulating a printed circuit board or the like. 305,091, 12-19-89, Cl. D8-14.000.

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50.7 4,887,433
55.5 4,887,434
85 4,887,435
155 4,887,436
186 4,887,437
271 4,887,438

CLASS 65

18.1 4,888,036
32.2 4,888,037
114 4,888,038
139 4,888,039
307 4,888,040

CLASS 66

51 4,887,439
145 S 4,887,440

CLASS 70

25 4,887,441
143 4,887,442
209 4,887,443
233 4,887,444
278 4,887,445

CLASS 71

88 4,888,041
4,888,042
4,888,043
4,888,044
90 4,888,045
4,888,046
92 Re.33,132
4,888,047
4,888,048
94 4,888,049
108 4,888,050

CLASS 72

22 4,887,446
332 4,887,447
344 4,887,448
356 4,887,449
391 4,887,450
402 4,887,451
420 4,887,452

CLASS 73

1 R 4,887,453
11 4,887,454
27 R 4,887,455
35 4,887,456
49.3 4,887,457
61.1 R 4,887,458
81 4,887,459
118.1 4,887,460
4,887,461
118.2 4,887,462
146 4,887,463
153 4,887,464
313 4,887,465
338 4,887,466
517 B 4,887,467
660 4,887,468
861.77 4,887,469
862.68 4,887,470
862.69 4,887,471
863.86 4,887,472
864.35 4,887,473
865.9 4,887,474
866 4,887,475

CLASS 74

7 E 4,887,476
89.17 4,887,477
354 4,887,478
424.8 NA 4,887,479
459 4,887,480
500.5 4,887,481
502.6 4,887,482
526 4,887,483
556 4,887,484
574 4,887,485
588 4,887,486
687 4,887,487
689 4,887,488
801 4,887,489
844 4,887,490
866 4,887,491

CLASS 75

10.11 4,888,051
20 R 4,888,052
77 4,887,492
101 R 4,888,053
234 4,888,054

CLASS 76

5 R 4,887,493
27 4,887,494
104 R 4,887,495
108 R 4,887,496

CLASS 81

3.37 4,887,497
185 4,887,498
470 4,887,499

CLASS 82

12 4,887,500
54 4,887,501

CLASS 83

479 4,887,502

CLASS 84

474 4,887,507
613 4,887,503
714 4,887,505
715 4,887,504
727 4,887,506

CLASS 86

23 4,887,508
36 4,887,509

CLASS 89

163 4,887,510

CLASS 91

361 4,887,511
471 4,887,512

CLASS 92

63 4,887,513
79 4,887,514
80 4,887,515
98 D 4,887,516
128 4,887,517
212 4,887,518
228 4,887,519

CLASS 98

2 4,887,520
31 4,887,521
40.2 4,887,522

CLASS 99

419 4,887,523
443 C 4,887,524
476 4,887,525

CLASS 101

116 4,887,527
148 4,887,528
181 4,887,529
4,887,530
216 4,887,531
225 4,887,532
492 4,887,533

CLASS 102

373 4,887,534

CLASS 105

3 4,887,535

CLASS 106

1.05 4,888,055
1.17 4,888,056
18.12 4,888,057
98 4,888,058
314 4,888,059

CLASS 108

35 4,887,536
44 4,887,526
55.1 4,887,537
111 4,887,538

CLASS 110

165 R 4,887,539
263 4,887,962

CLASS 114

57 4,887,540
68 4,887,541
108 4,887,542
267 4,887,654

CLASS 116

201 4,887,543

CLASS 118

50 4,887,544
63 4,887,545
306 4,887,546
410 4,887,547
722 4,887,548

CLASS 119

29 4,887,549
56.2 4,887,550
109 4,887,551
4,887,552
154 4,887,553
159 4,887,554

CLASS 122

382 4,887,555

CLASS 123

1 A 4,887,556
52 MC 4,887,557
58 C 4,887,558
73 AD 4,887,559
78 F 4,887,560
90.12 4,887,562
90.16 4,887,561
4,887,563
90.25 4,887,564
90.26 4,887,565
90.51 4,887,566
190 D 4,887,567
270 4,887,568
300 4,887,569
339 4,887,570
367 4,887,571
414 4,887,572
422 4,887,573
425 4,887,574
435 4,887,575
479 4,887,576
494 4,887,577
519 4,887,578
525 4,887,579
564 4,887,580
602 4,887,581

CLASS 124

23 R 4,887,582
40 4,887,583
90 4,887,584

CLASS 125

14 4,887,585

CLASS 126

101 4,887,586
299 D 4,887,587
299 R 4,887,588
418 4,887,589

CLASS 127

60 4,888,060

CLASS 128

36 4,887,594
80 C 4,887,590
205.21 4,887,591
206.11 4,887,597
422 4,887,603
654 4,887,604
660.03 4,887,605
662.05 4,887,606
670 4,887,607
673 4,887,608
696 4,887,609
733 4,887,610
743 4,887,611
751 4,887,612
798 4,887,614
850 4,887,615
879 4,887,616

CLASS 131

70 4,887,617
297 4,887,618
305 4,887,619
352 4,887,620

CLASS 132

309 4,887,621
320 4,887,622

CLASS 134

64 R 4,887,623
98 4,887,624

CLASS 135

75 4,887,625
119 4,887,626
120 4,887,627

CLASS 136

251 4,888,061
258 4,888,062
259 4,888,063

CLASS 137

8 4,887,628
15 4,887,629
72 4,887,630
74 4,887,631
117 4,887,632
225 4,887,633
315 4,887,634
393 4,887,635
487.5 4,887,636
504 4,887,637
505.13 4,887,638
505.41 4,887,639
564.5 4,887,640
601 4,887,641
625.41 4,887,642
625.66 4,887,643
876 4,887,644
884 4,887,645

CLASS 138

90 4,887,646
126 4,887,647

CLASS 139

383 H 4,887,648
450 4,887,649
460 4,887,650

CLASS 141

1 4,887,651
4,887,857
59 4,887,652

CLASS 144

286 R 4,887,653

CLASS 148

2 4,888,064
16.5 4,888,065
26 4,888,067
104 4,888,068
113 4,888,066
404 4,888,069

CLASS 152

531 4,887,655
4,887,656

CLASS 156

48 4,888,070
50 4,888,071
108 4,888,072
197 4,888,073
217 4,888,074
243 4,888,075
245 4,888,076
249 4,888,078
285 4,888,077
319 4,888,079
344 4,888,080
359 4,888,081
500 4,888,082
521 4,888,083
600 4,888,084
613 4,888,085
639 4,888,086
643 4,888,087
4,888,088
644 4,888,089
665 4,888,090

CLASS 160

178.1 4,887,657
190 4,887,658

199 4,887,659
265 4,887,660

CLASS 162

109 4,888,091
130 4,888,092
157.6 4,888,093
198 4,888,094
202 4,888,095
358 4,888,096

CLASS 164

55.1 4,887,661
427 4,887,662

CLASS 165

47 4,887,663
76 4,887,664
4,887,665
4,887,666
96 4,887,667

CLASS 166

55.8 4,887,668
75.1 4,887,669
281 4,887,670
308 4,887,671
344 4,887,672
382 4,887,673

CLASS 169

61 4,887,674

CLASS 174

38 4,888,448
52.4 4,888,449
68.5 4,888,450
94 R 4,888,451
101 4,888,452
135 4,888,453

CLASS 175

228 4,887,675
250 4,887,676
339 4,887,677

CLASS 177

134 4,887,678
245 4,887,679

CLASS 180

53.3 4,887,680
68.1 4,887,681
79.1 4,887,682
148 4,887,683
179 4,887,684
209 4,887,685
211 4,887,686
219 4,887,687
227 Re.33,130
229 4,887,688
233 4,887,689

CLASS 181

150 4,887,690
210 4,887,691
235 4,887,692
242 4,887,693

CLASS 182

82 4,887,694

CLASS 187

116 4,887,695

CLASS 188

73.45 4,887,696
79.62 4,887,697
325 4,887,698
378 4,887,699

CLASS 190

111 4,887,700

CLASS 191

30 4,888,454

CLASS 192

1.56 4,887,701
4 A 4,887,702
45 4,887,703
90 4,887,704
111 A 4,887,705

CLASS 198

774 4,887,706
781 4,887,707
831 4,887,708

CLASS 200

61.04 4,888,455
61.27 4,888,456
283 4,888,457
400 4,888,458

CLASS 203

1 4,888,097

CLASS 204

1 R 4,888,098
95 4,888,099
157.15 4,888,101
157.7 4,888,100
231 4,888,102

CLASS 206

45.14 4,887,709
63.3 4,887,710
92 4,887,711
225 4,887,713
269 4,887,712
370 4,887,715
411 4,887,714
427 4,887,716
575 4,887,717
597 4,887,719
611 4,887,718
621.2 4,887,720

CLASS 208

73 4,888,103
112 4,888,104
137 4,888,105
188 4,888,107
424 4,888,108

CLASS 209

3 4,887,722
167 4,888,106
579 4,887,721
670 4,887,723

CLASS 210

94 4,888,109
106 4,888,110
178 4,888,111
198.2 4,888,112
222 4,888,113
500.25 4,888,114
636 4,888,115
4,888,116
649 4,888,117
668 4,888,118

CLASS 211

11 4,887,724
74 4,887,726
124 4,887,727
208 4,887,728

CLASS 215

100 A 4,887,729
271 4,887,730

CLASS 219

10.55 B 4,888,461
10.55 E 4,888,459
10.55 R 4,888,460
69.2 4,888,462
83 B1 3,842,235
201 4,888,463
216 4,888,464
301 4,888,465
4,888,466
4,888,467
347 4,888,468
370 4,888,469
458 4,888,470
501 4,888,471
548 4,888,472

CLASS 220

1.5 4,887,731
90.6 4,887,732
203 4,887,733
306 4,887,734
307 4,887,735
355 4,887,736

CLASS 221

3 4,887,737
232 4,887,739
264 4,887,738

CLASS 222

129.1 4,887,740
146.5 4,887,741
153 4,887,742
402.1 4,887,743
4,887,744
499 4,887,745
519 4,887,746
556 4,887,747
606 4,887,748

CLASS 223

111 4,887,749

CLASS 224

42.11 4,887,750
151 4,887,751
202 4,887,752
312 4,887,753
319 4,887,754

CLASS 225

103 4,887,755

CLASS 226

109 4,887,778

CLASS 227

19 4,887,756
147 4,887,757

CLASS 228

5.1 4,887,758
20 4,887,759
56.3 4,887,760
107 4,887,761
260 4,887,762

CLASS 229

71 4,887,763
102 4,887,764
123.2 4,887,765
125 4,887,766

CLASS 235

376 4,888,473
449 4,888,474
487 4,888,475

CLASS 236

1 EB 4,887,767

CLASS 239

222 4,887,768
493 4,887,769
703 4,887,770
722 4,887,771

CLASS 241

92 4,887,772
171 4,887,773

CLASS 242

58.6 4,887,774
68.1 4,887,775
71.1 4,887,776
106 4,887,777

CLASS 244

1 R 4,887,779
137.2 4,887,780
190 4,887,781
234 4,887,782

CLASS 248

220.4 4,887,783
311.2 4,887,784
339 4,887,785
512 4,887,786
551 4,887,787
562 4,887,788

CLASS 249

16 4,887,789
52 4,887,790
115 4,887,791

CLASS 250

201 4,888,476
4,888,477
202 4,888,478
221 4,888,479
226 4,888,480
231 SE 4,888,481
281 4,888,482
336.1 4,888,483
343 4,888,484
363.04 4,888,486
370.06 4,888,485
455.1 4,888,487
492.1 4,888,488
504 H 4,888,489
561 4,888,490
4,888,491
578 4,888,492

CLASS 251

82 4,887,792
208 4,887,793
315 4,887,794

CLASS 252

8.551 4,888,120
8.553 4,888,121
8.75 4,888,119
25 4,888,122
135 4,888,123
182.2 4,888,124
182.21 4,888,125
299.5 4,888,126
4,888,127
301.23 4,888,128
301.6 S 4,888,129
373 4,888,130
4,888,131
393 4,888,132
400.61 4,888,133
511 4,887,795
4,888,134
512 4,888,135
607 4,888,136

CLASS 256

8 4,887,796

CLASS 264

4.3 4,888,140
22 4,888,141
65 4,888,142
66 4,888,143
120 4,888,144
126 4,888,145
171 4,888,146
207 4,888,147
209.5 4,888,148

CLASS 266

49 4,887,797
99 4,887,798
168 4,887,799
270 4,887,800

CLASS 267

140.1 4,887,801
148 4,887,802

CLASS 269

32 4,887,803
73 4,887,804

CLASS 271

94 4,887,805
121 4,887,806
171 4,887,807
181 4,887,808
203 4,887,809
225 4,887,810

CLASS 272

56.5 R 4,887,811
238 4,887,854

CLASS 273

1.5 R 4,887,812
54 C 4,887,813
65 EE 4,887,814
77 A 4,887,815
144 A 4,887,816
210 4,887,817
254 4,887,818
256 4,887,819
323 4,887,820
411 4,887,821
420 4,887,822

CLASS 280

19 4,887,823
87.042 4,887,824
4,887,825
250.1 4,887,826
272 4,887,827
280 4,887,828
282 4,887,829
304.1 4,887,830
416.3 4,887,831
615 4,887,832
4,887,833
642 4,887,834
646 4,887,835
651 4,887,836
654 4,887,837
656 4,887,838
690 4,887,839
707 4,887,840
719 4,887,841
730 4,887,842
735 4,887,843
779 4,887,844

CLASS 283

81 4,887,845

CLASS 285

18 4,887,846
52 4,887,847
55 4,887,848
91 4,887,849
137.1 4,887,850
158 4,887,851
175 4,887,852
287 4,887,853

CLASS 290

4 C 4,888,493

CLASS 292

307 R 4,887,855
337 4,887,856

CLASS 294

1.1 4,887,858

CLASS 296

26 4,887,859
4,887,860
70 4,887,861
204 4,887,862

CLASS 297

362 4,887,863
375 4,887,864
382 4,887,865
421 4,887,866

CLASS 298

1 H Re.33,131

CLASS 299

42 4,887,867
57 4,887,868

CLASS 303

113 4,887,871
114 4,887,869
116 4,887,870

CLASS 305

10 4,887,872

CLASS 307

38 4,888,494
39 4,888,495
264 4,888,496
272.3 4,888,497
296.4 4,888,498
471 4,888,499
475 4,888,500
4,888,501
520 4,888,502
530 4,888,503
570 4,888,504
571 4,888,505

CLASS 310

13 4,888,506
40 MM 4,888,507
42 4,888,508
4,888,509
54 4,888,510
156 4,888,512
216 4,888,513
237 4,888,511
316 4,888,514
323 4,888,515
4,888,516

CLASS 312

184 4,887,873
258 4,887,874

CLASS 313

25 4,888,517
40 4,888,518
292 4,888,520
318 4,888,519
366 4,888,521

CLASS 315

111.61 4,888,522
169.3 4,888,523
200 R 4,888,524
212 4,888,525
282 4,888,527
324 4,888,526
344 4,888,528
370 4,888,529

CLASS 318

254 4,888,530
282 4,888,531
480 4,888,532
524 4,888,533
567 4,888,534
568.1 4,888,535
592 4,888,536
626 4,888,537
675 4,888,538
685 4,888,539
689 4,888,540
696 4,888,541
4,888,542
721 4,888,543

CLASS 320

37 4,888,544

CLASS 323

258 4,888,545

CLASS 324

58.5 A 4,888,547
61 R 4,888,824
64 4,888,546
73 R 4,888,548
4,888,549
158 P 4,888,550
208 4,888,551
309 4,888,552
312 4,888,553
316 4,888,554
318 4,888,555
439 4,888,818

CLASS 328

233 4,888,556

CLASS 329

341 4,888,557
345 4,888,558

CLASS 330

253 4,888,559
254 4,888,560
290 4,888,561
291 4,888,562
296 4,888,563

CLASS 331

1 A 4,888,564
25 4,888,565
116 R 4,888,566
4,888,567

CLASS 333

174 4,888,568
209 4,888,569

CLASS 335

167 4,888,570

CLASS 336

65 4,888,571
4,888,572

CLASS 337

164 4,888,573

CLASS 338

62 B1 3,858,147
309 4,888,574

CLASS 340

426 4,888,575
451 4,888,576
461 4,888,577
546 4,888,578
572 4,888,579
573 4,888,580
666 4,888,581
703 4,888,582
729 4,888,583
747 4,888,584
812 4,888,599
825.050 4,888,586
825.340 4,888,585

CLASS 341

24 4,888,600
122 4,888,587
4,888,588
153 4,888,589

CLASS 342

3 4,888,590
44 4,888,591
359 4,888,592
387 4,888,593
389 4,888,594
457 4,888,595

CLASS 343

703 4,888,596
778 4,888,597

CLASS 346

76 PH 4,888,601
134 4,888,602
140 R 4,888,598
160 4,888,603

CLASS 350

96.11 4,887,877
96.13 4,887,878
96.15 4,887,879
4,887,880
96.2 4,887,876
96.20 4,887,881
4,887,882
96.21 4,887,875
4,887,883
96.29 4,887,884
162.11 4,887,885
166 4,887,886
247 4,887,888
252 4,887,887
311 4,887,889
357 4,887,890
427 4,887,891
523 4,887,892
618 4,887,893
636 4,887,894

CLASS 351

63 4,887,895
4,887,896
103 4,888,808
233 4,887,897

CLASS 353

28 4,887,898

CLASS 354

21 4,888,604
75 4,888,605
76 4,888,606
299 4,888,608

323 4,888,607
402 4,888,609
475 4,888,610

CLASS 355

32 4,888,611
35 4,888,612
41 4,888,613
43 4,888,614
200 4,888,615
202 4,888,616
203 4,888,617
208 4,888,618
210 4,888,619
211 4,888,620
326 4,888,621

CLASS 356

35.5 4,887,899
350 4,887,900
352 4,887,901
363 4,887,905
372 4,887,903
373 4,887,902
375 4,887,904
402 4,887,906

CLASS 357

5 4,888,622
4,888,629
15 4,888,623
16 4,888,624
17 4,888,625
22 4,888,626
23.4 4,888,627
23.5 4,888,630
23.6 4,888,628
4,888,631
23.7 4,888,632
24 4,888,633
72 4,888,634
81 4,888,637

CLASS 358

75 4,888,635
80 4,888,636
84 4,888,638
98 4,888,639
133 4,888,640
141 4,888,641
160 4,888,642
183 4,888,643
192.1 4,888,819
209 4,888,644
261.1 4,888,645
335 4,888,648
4,888,649
4,888,651
451 4,888,650
464 4,888,646
471 B1 4,149,197
474 4,888,647

CLASS 360

5 4,888,652
15 4,888,653
74.1 4,888,654
97.03 4,888,655
106 4,888,656
122 4,888,657
126 4,888,658
132 4,888,659

CLASS 361

49 4,888,660
102 4,888,661
283 4,888,662
313 4,888,820
383 4,888,664
385 4,888,663
400 4,888,665
512 4,888,666

CLASS 362

109 4,888,667
145 4,888,669
205 4,888,670
250 4,888,671
291 4,888,668

CLASS 363

21 4,888,673
4,888,821
35 4,888,674
47 4,888,675
49 4,888,672
58 4,888,676
60 4,888,677
146 4,888,678

CLASS 364

200 4,888,679
4,888,680
4,888,681
4,888,682
4,888,683
4,888,684
4,888,685
4,888,686
4,888,687
4,888,688
4,888,689
4,888,690
300 4,888,691
402 4,888,692
413.13 4,888,695
413.16 4,888,693
413.24 4,888,694
424.05 4,888,696
431.11 4,888,697
443 4,888,698
449 4,888,699
466 4,888,700
482 4,888,701
494 4,888,702
496 4,888,703
500 4,888,704
506 4,888,720
508 4,888,705
510 4,888,706
513 4,888,707
4,888,708
518 4,888,709
520 4,888,710
522 4,888,711
4,888,712
4,888,713
525 4,888,714
550 4,888,715
4,888,716
559 4,888,717
564 4,888,718
721 4,888,719
736 4,888,721
736.5 4,888,722
786 4,888,723
807 4,888,724
4,888,725
900 4,888,726
4,888,727
4,888,728
4,888,729
4,888,730

CLASS 365

49 4,888,731
51 4,888,732
145 4,888,733
185 4,888,734
4,888,735
189.01 4,888,736
203 4,888,737
218 4,888,738
221 4,888,739
230.05 4,888,741

CLASS 366

99 4,887,907
149 4,887,908
199 4,887,909
312 4,887,910
316 4,887,911

CLASS 367

30 4,888,740
53 4,888,742
75 4,888,743
90 4,888,744
129 4,888,745
138 4,888,746
173 4,888,747

CLASS 368

107 4,888,748
157 4,888,749

CLASS 369

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DESIGN PATENTS

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PLANT PATENTS

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